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PHOTOGRAPHY FOR THE AMATEUR

By GEO. W. FRENCH

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you make a negative that does not prove successful you may rest assured that in some detail, apparently unimportant or perhaps entirely overlooked, you have transgressed these natural laws. A repetition of the same difficulties is avoided only by carefully locating the cause of the first failure.

Read; make notes; carry them; and consult them frequently at the appropriate time—these are excellent rules to follow.

HOW TO STUDY THIS BOOK

The method used in studying any book is very important, and especially is this true in Photography. If you attempt to digest too much of the material herein, at a few readings, you will soon relegate the book to the attic in despair, therefore, go about it correctly.

It is well to read through the whole book at the start, if you get well interested, but no notes whatsoever should be made at this reading. Your second, third, fourth, and further readings are the readings on which to make your notes.

For the beginner, all he will need for a while is written in the first eleven chapters. The subject-matter is given with the object of making it just as easy and simple as possible for the beginner, therefore, every step is laid out in a simple manner and with an eye to the order in which the different steps should be studied. Naturally a description of cameras and lenses belongs in the opening pages of the book, but it does not necessarily imply that the beginner should thoroughly learn these principles before taking a picture. By learning to operate his camera correctly, meanwhile referring to the chapter devoted to that subject, he will soon have acquired quite a thorough understanding of the technical principles of the subject.

In brief, here are the logical steps to master in progressing:

1. Learn to operate your camera.

2. Study the matter on Making the Exposure.

3. Your next steps are Developing, Fixing, and Washing the negative.

4. Then you should refer to "Beginner's Troubles," Series 1.

5. Then comes Printing, Developing, Fixing, and Washing the picture.

6. "Beginner's Troubles," Series 2, logically follows.

7. Mounting naturally follows, and then the somewhat more advanced topics.

Consult the Table of Contents, frequently, and you will need no more advice here.

GEORGE W. FRENCH,
LYONS FARMS, N. J.

CHAPTER I

PICTURE TAKING—RECREATIONAL, EXUBERATING, AESTHETIC

SEVERAL years ago there lived on a rocky farm in the State of Maine, a youngster whose greatest dual ambition up to the age of fourteen, was to be able to part in the middle, a head of red hair, topped off by a most obstinate "cowlick," and to learn to draw funny pictures. The countryside at that time was, to him, nothing but a section of the earth left there for the select use of the natives in hunting, fishing, and raising enough to eat and wear.

One day this youth, while plodding along behind the principal live stock of the farm, a cow, en route for the pasture, "spotted" at some distance ahead and plumb in the middle of the road, what appeared to be a headless monster in black, pointing a huge gun of some ridiculous design directly at him. As he was about to make a prodigious leap into the bushes, as old "mooley cow" had already done, a smiling face emerged from behind the muzzle of the "gun," accompanied by a voice saying, "Just stand up there by the gate a second, and I will take your picture."

Several days after the incident, the boy was amazed at receiving a sheet of cardboard on which was a reddish brown image of himself. You no doubt remember something of the sensation accompanying the inspection of your first physiognomy on paper, therefore why elaborate, except to say that just at that time a new ambition was born—an ambition to own one of those three-legged picture-making machines.

It was several years later that the desire was realized, and the youngster really owned a camera. It was not a "three-legged" one, to be sure—it was a box camera and a cheap one at that, because value in quality presented no preference to him.

Fortunately for him, the nearest dealer in photographic supplies, consequently the nearest finisher of pictures, was forty miles away, therefore, it was quite expedient that he learn to do his own work in every detail.

Friends, what days those were. Talk about a fellow with a new automobile! Do you think he has anything on the chap who has a camera for the first time and begins right, that is, by doing all the work of producing the pictures himself? Never! It's a pity for owners of cameras in general, and for the art itself, that more are not fixed as this young chap was—compelled by necessity to do their own work. Then they would sense the real joy that comes with trying to reach an ideal, an ideal made doubly attractive from being associated with a hobby. It is true that "necessity is the mother of invention"; but even if it is not associated with invention, it certainly tends to develop self-dependence, and consequently self-confidence and ability. In the case cited, the possession of that first camera and the obstacles overcome in learning to produce satisfying results was responsible for an enlarged vision of life and the beauties therein, assets within easy grasp of all who will try to recognize and seize upon them.

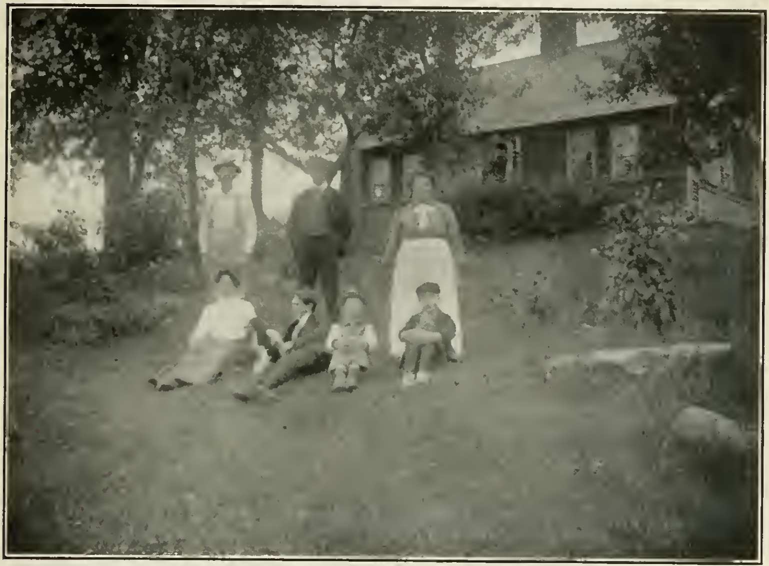

Fig. 1

Made with a cheap box camera. Poor definition.

With that old box camera and the inspiration acquired from frequent close perusal of such good friends to amateurs as Photo-Era, American Photography (then under a different name), The Camera, and other old favorite photographic magazines, the countryside gradually became a veritable Garden of Eden. Even the most aggravating and despicable animals developed interesting pictorial characteristics. "Kids" became interesting because they proved to be the toughest proposition to photograph in desired poses, and even the "town characters" were regarded as being of other use than simply subjects for gossiping tongues—they were ideal characters for certain types of pictures. Sunshine became to this maker of photographs what yellow and orange tinctures are to the brush artist, instead of a producer of freckles and manufacturer of potatoes-to-be-dug. Snow became beautiful as well as the herald of coasting days. Rain presented another phase for pictorial work, instead of being regarded as a signal for renovating the umbrella, or cleaning out the attic. The old stump fence, formerly useful only for keeping the rambumptious cow within bounds, became one of the most picturesque features of the farm, and the trees—the pine, the oak, the beech, the maple, the birch—all came to be loved in proportion to their importance as producers of balance, masses, etc., in pictures.

Of course the old box camera soon passed away, and the usual line of different styles and makes "carried on" in its place, but it is not the type of camera, after all. that I am emphasizing, it is the aesthetic, the recreational, and the joy-giving phases of life that proper use of any camera will develop, and by properly using the camera, I refer not only to operating it, but also to performing the after procedures that must be carried out before the picture is made.

The youngster to which reference is made here, has had his "ups and downs," but through it all, the one constant source of care-free recreation and even inspiration, has been his camera. It has brought pleasure; it has brought thrills; it has developed vision; it has been responsible for an education; it has brought remuneration in pinches; and last but not least it has brought friends.

What more, after this rather lengthy preamble, can I say to emphasize my confidence and faith in the camera as a well-spring of joy to the man or woman who will use it as a musical artist would use his or her instrument.

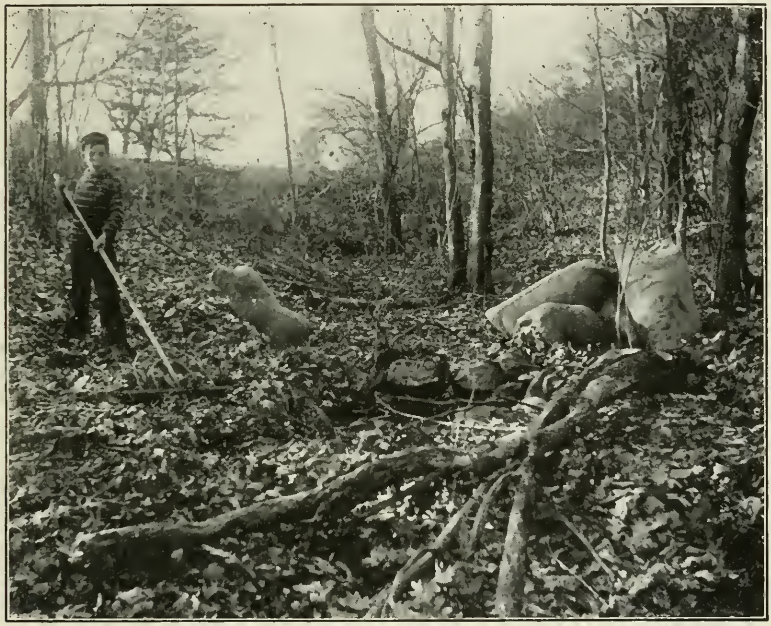

Fig. 2

The Whistling Farm Boy—Taken with a better type of box camera. Timed two seconds by setting the camera on a stump. Poor foreground

I believe that the worst criticism of our twentiethcentury mode of life is its tendency to draw us away from the great out-of-doors. Would that more of us were like those wonderful characters in the masterful poems of Robert Service—have you read his "The Spell of the Yukon"? If you haven't, read it at your next opportunity. The world owes one big vote of thanks to all such men as those who can so write as to draw us out of our shells into the great open. We shall never realize what such men as Service, and David Grayson—have you read his "Along the Friendly Road"?—and such great works as the Boy Scout Movement have done towards restraining us a little longer, at least, from falling into the "melting pot."

If once you become affected by the lure of the camera so that it leads you into the open, the experience will bring a wonderful fund of useful and pleasurable knowledge of the beauties of nature and the delights of picture-hunting. These hunts not only enlarge one's mental vision, but they add vitality to the physical well-being.

There is an inherent love of nature in our hearts when we reach this planet. It is strong in childhood. If one keeps it alive, the rambles in one of her pleasant places is most delightful. A cultivation of the love of the high and the low places, the mountain and the seashore, and even the briny deep itself produces an enlarged outlook upon life and the Creator of them all.

Go to the great out-of-doors with your camera as a companion, away from the irritating, nerve-racking artificialities of life; there is art in nature if you can but see it; your camera is ever ready to aid you to make it permanent if you give it a chance; and when the day is done, you return home hungry and weary in body, but with an enlarged vision and refreshed for the business of the morrow.

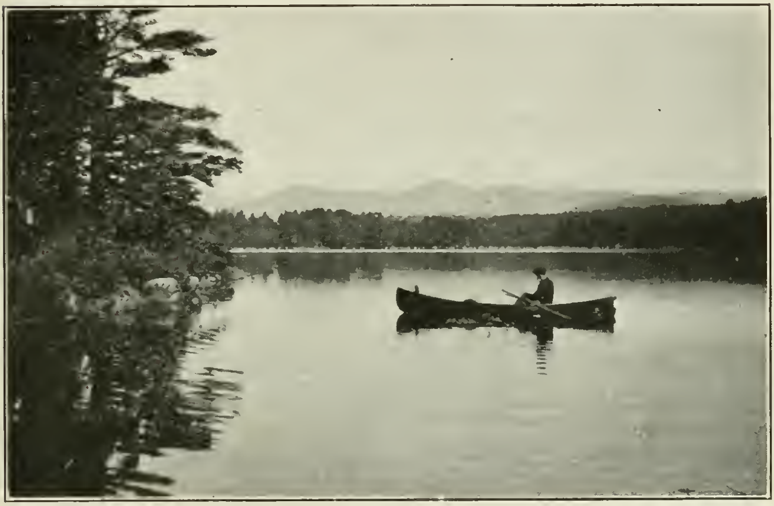

Fig. 3

A Bit of the Great Out-of-Doors. Taken by *W. R. French, Veteran Guide of the Maine Woods*

I am rather emphasizing the nature side of camera work, but with a motive—the motive of enthusing you to make your experience count for what it can be made to count by pursuing an ideal, that ideal being to become skillful at all of the everyday phases of amateur photography. My advice is based not only on personal experience, but also upon the multitudinous testimonials of the many amateurs with whom I have been associated in camera clubs and in business.

Of course, your albums should be pictorial illustrations of your friends, your children, and the different stages of their career; the journeys which you make, the vacations which you cherish, and so on, but I stress nature work above all others, because of the many and varied returns which such work brings.

Keep an ideal before you, follow it, and your albums will be books of beauty and harbingers of joy. Forget your ideal and satisfaction is short-lived. By the aid of your camera you can live over again the days in the open, and many other cherished experiences of your life.

There is an ever-increasing number of amateurs who follow such an ideal, and recent years have shown much improvement in depicting nature. The material is there and can be found when the mind is alert—when the eye is trained to see the artistic.

As you progress in the art, you will be agreeably surprised by the grip with which it seizes you. You will devour with relish the contents of all the photographic periodicals on which you can lay hands. Nature in her various moods will exert a powerful influence upon you. You will suddenly become intensely interested in the famous paintings of history. A study of composition will engage your serious attention, and before you are aware, you will be a full-fledged seeker after the picturesque and the artistic in everything about you wherever you go. Then as you wander through the fields, meadows, and woods, or by the riverside, or wallow through the snow, you will pick up treasures by the way undreamed of and unseen by the careless eye.

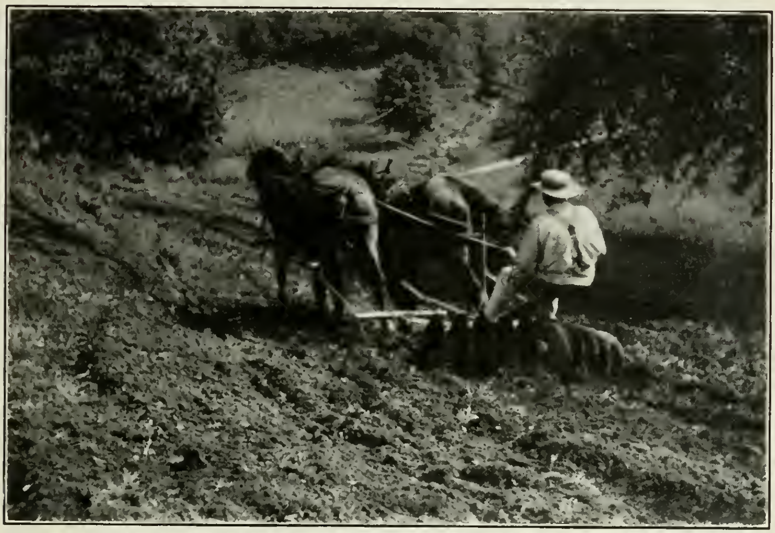

Fig. 4

Harrowing—This is but one of the many subjects with which the alert camerist comes in contact. The background is unusually interesting. Taken with a 3-A Kodak

Then this simply written book will be laid aside for the more comprehensive volumes which are on the market and which elaborate fully on the various phases of artistic photography.

In bringing this initial preamble to a close, I trust that I have made clear my motive in writing it. What I have said comes direct from the heart of one who loves the art of making pictures and who, thank

Heaven, began by seeing the process through from the snap of the lever to the pasting of the product in the album. You can get lots of fun out of "pushing the button," and paying good cash to the professional finisher for the rest of the job, but you cannot experience the real thrills of the game except by crawling into your makeshift dark room, performing the necessary chemical operations, and then watching the negative image appear on the plate or film. And too, you lose the fun of making the final operations involved in making the picture.

In a nutshell, then, my motive is to urge you to begin right by making a study of the art of picture-making with the camera from the focusing of the lens to the washing of the print, for, only under such conditions, will you derive from your photographic experience the real returns that await you—returns in cash saved, returns in fun, returns in knowledge, returns in vision, recreation, and above all, a love of nature.

"Where the blackbird sings the latest,
Where the hawthorn blooms the sweetest,
Where the mowers mow the cleanest,
Where the hay lies thick and greenest,
Where the hazel bank is steepest,
Where the shadow falls the deepest,
Up the river and o'er the lea,
That's the place for Billy and me."

Equipment for the Beginner

"What is one man's meat is another man's poison," is a proverb that applies not to food alone, but, figura-

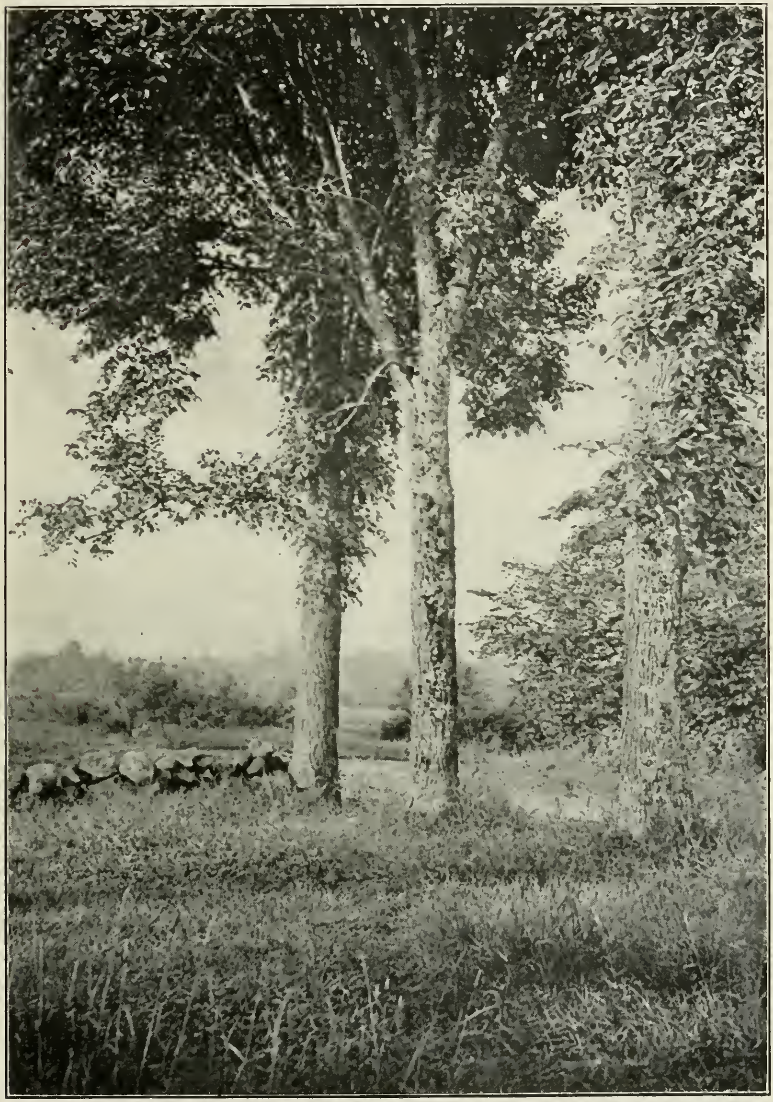

Fig. 5

Sentinels of the Wayside—Trees are a part of the garden of the Great Out-of-Doors. The beginner should learn to love them. Taken with a 2¼ x 3¼ Ansco, and enlarged tively speaking, to many other matters involving choice.

It is particularly applicable to the choice of photographic equipment, and altho there are certain required articles that should go with every such equipment, yet, no one man can lay down any hard and fast rules as to what another man should possess. What I shall suggest to you in this line is what I personally would procure were I to begin over.

The Camera

I would start with a simple camera, such as a folding, fixed focus Kodak, because it does not have to be focused; it does not cost much either to buy or to run: it makes pictures that are sharp, clean into the distance, and that's what a beginner likes; it does not distort; and finally, when the technique of the art has been pretty well mastered as far in as possible with such a camera, and the desire to own a better camera comes, as it inevitably does come to him who learns the game, the change can be made without an appreciable sacrifice.

As to the size, 2¼ x 3¼ has always been my favorite, for sharp negatives made with it enlarge nicely to 8 x 10, and a 2¼ x 3¼ print is large enough to make a desirable picture.

Other Equipment

Book of instructions.
Tripod, but not a cheap one.
Exposure guide or meter.
Sky filter.
Direct view finder.

3 trays, 4 x 5 inches, white enamel.
1 tray, 8 x 10 inches, white enamel.
1 dark room lamp (also a red bulb, if electricity is at hand).
1 doz. film clips.
1 loose leaf album.
1 oz. flashlight powder.
2 tubes Grippit.
1 gross, postcard size, Glossy Azo. F. Hard X (this size cuts into two sheets, 2¼ x 3¼)
½ gross, postcard size, Glossy Azo, grade F, soft.
1 doz. lintless blotters, size 8 x 10, at least.
2 doz. tubes of developer.
Acid Hypo — several pounds.
1 16 oz. graduate.
1 8 oz. graduate.
1 heavy stirring rod.
1 print paddle, rubber.
1 special thermometer.
1 jar of paste.
1 2¼ x 3¼ printing frame.
Films.
1 3¼ x 5½ printing frame for postcards.
Several Ferrotype plates for glossy prints.
1 dropper.
1 pencil for writing on glass.
1 32-oz. bottle for hypo, preferably with a large mouth.
1 16-oz. bottle for developer.
1 drying rack, if plates are used.
1 glass to fit the frame.
1 trimmer with at least an 8-inch blade.
1 set masks for printing white margins.
4 ozs. absorbent cotton.
1 print roller.
1 jar opaque.
Scales for weighing grains and ounces; set of apothecary weights. (You will not need these until you plan to make your own solutions.)
1 small pointed brush.

1 box adhesive labels.
1 square yard of orange paper.
1 roll of 1-inch gummed paper.
1 pair scissors.
A small notebook, unless you wish to buy a Wellcome's Exposure Diary.
Towels.
1 funnel (glass).
1 corkscrew.
2 doz., or more, embossed mounts.
1 sheet of heavy 8 x 10 glass.
1 sheet heavy cardboard, size 1½ x 2 feet.
Package of large headed pins.
Washing tank if plates are used.
1 film album, or a filing box, large enough to hold 200 or more films.
Several corks.
1 strip of oil cloth, 2 ft. by 4 ft. (for use when mixing solutions, or when developing, etc.).
1 small box with cover labelled "contrast test-slips."
1 small box with cover labelled "soft test-slips."
1 two-inch camel's hair brush for plates.

Then if the wallet will permit, add a Kodak developing tank and an enlarging outfit to your equipment.

The equipment listed may sound rather elaborate, but it is not, as you will find after getting well started, and it is far more expedient to have the whole lot right where you can place your hand on it at any time, than to discover that you are in need of one of the articles at a time when time is pressing. Before you have progressed far, you will find use for every single article listed, all of which will be mentioned elsewhere in this book.

I believe that I would also add to this list a subscription to Kodakery, published by the Eastman Kodak Company of Rochester, N. Y., and one of the other magazines that I have mentioned in this chapter.

CHAPTER II

CAMERAS

INASMUCH as this book is written for the sole purpose of enabling a beginner in the art of photography to learn the A B C of the pastime, with the least amount of waste, both as concerns necessary descriptive matter and elaboration of processes, I shall treat each subject in such a manner as will guide him in making his selection of material and in learning the technical details of the general subject. Therefore, in discussing Cameras, I shall give just enough information to guide the beginner in his selection, leaving the bulk of the descriptive matter to the several excellent catalogs of the manufacturers of the various types.

What is a Camera?

Essentially it is a light-tight box with a piece of glass, called the lens, in one end, and a means of supporting the sensitive plate or film in the other end. Rays of light, reflected from the object to be photographed, pass through the lens to the plate, where they impress upon its sensitized surface the image of the object.

There are two general types of cameras:

1. The Box Camera.
2. The Folding Camera.

The Box Camera

Due to the simplicity of operation and the low price of this type, it is very popular. Either films or plates can be used in it, but it is essentially a film camera.

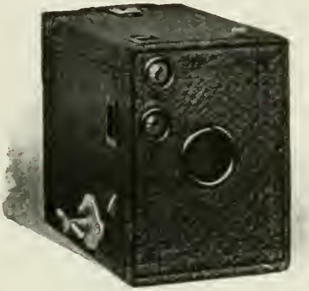

Fig. 6

Brownie Camera. A good make of box camera.

Films are more expensive than plates, but the simplicity of operating with them wins the odds. To operate with films, at least six different exposures can be made on one roll, while with plates it is necessary to carry a wooden or metal device known as a plate holder for every two plates, and for each exposure it is necessary to withdraw a slide from the holder.

The magazine box is an exception, for with this kind, a large number of plates, usually twelve, can be put directly into the camera itself, and exposed one after the other, thus doing away with the use of plate holders, but adding considerably to the weight of the affair.

As the Eastman Box Brownie is as widely known as any camera of this type, I will give a description of it here:

Brownie Box Cameras retain much of the skill of their forefathers—the highly efficient, but bulky box cameras of the last century—without their inconvenient weight and size.

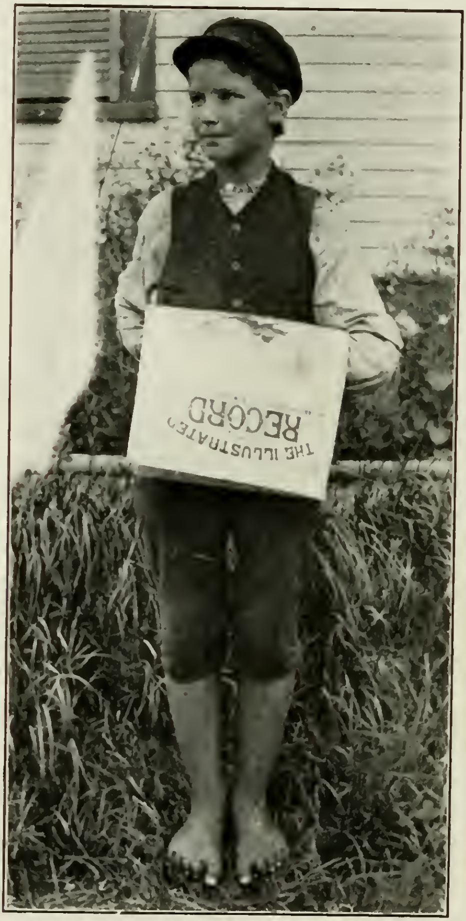

Fig. 7
The Newsboy—A type of picture often taken by beginners—the background is inappropriate and the pose is unnatural

There is no bellows to be pulled out; they are light in weight; their mechanism is simplicity itself; they are not fragile; they do not have to be focused; and both cameras and pictures are inexpensive.

These qualities make them equally desirable for adults or children who want a low priced, but practical and reliable camera.

The No. 0 Brownie makes the popular Vest Pocket size pictures, 1⅝ x 2½ inches, and the No. 2, 2¼ x 3¼ pictures. Both cameras are accurate, reliable, efficient and economical to operate and anybody can make good pictures with them from the start. They have the automatic shutter for snap-shots and time exposures; the No. 0 with one stop and No. 2 with three stops. Each has carefully tested meniscus lens and view finders, for vertical and horizontal exposures.

All the box Brownies are fixed-focus and consequently anyone can, with reasonable care, make excellent pictures with them. The No. 2-A makes pictures 2½ x 4¼ inches, while the No. 3 makes 3¼ x 4¼ pictures. Each has a carefully tested meniscus achromatic lens, Eastman Rotary shutter with three stops, two view finders, and the No. 3 is supplied with two tripod sockets. Both cameras are covered with durable imitation leather covering, with metal parts nickeled, and have the daylight-all-the-way feature of the Kodaks.

The shape of the 2-C Brownie makes it practically as easy to carry as a smaller box, while the shape of the picture, measuring 2⅞ x 4⅞ inches, is adapted to almost any composition. The size of the picture and the details of the camera have, together, made this one of the most popular Brownies. With moderate weight, a capacity of six or ten exposures and the Brownie

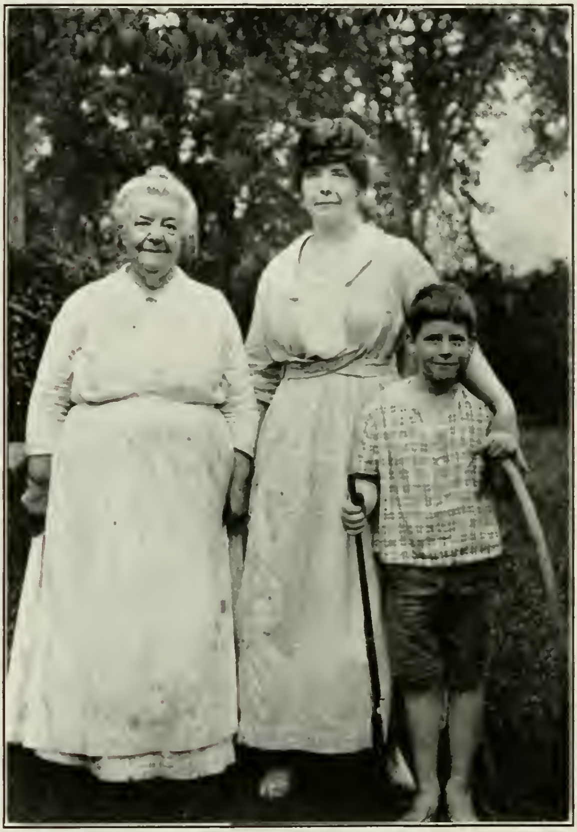

Fig. 8

A Happy Group—A better type of the beginner's class of pictures. The background is much better than in the preceding figure. By *Mabel S. French* stability, reliability and simplicity, it fits average needs at low cost.

The principle advantages of the box camera are:

1. Simplicity—no focussing, as it is what is termed a "fixed focus" camera for all distances beyond 6 to 10 feet; simple to operate.
2. Inexpensiveness.
3. Permits of both instantaneous and time exposures.
4. Permits of both vertical and horizontal pictures.

The disadvantages are:

1. It has but a single lens.
2. It cannot be focused close up without special accessories.
3. It has no rising front, or swing-back attachments, making it impractical when taking pictures of tall buildings.
4. Very few are made for pictures larger than 4 x 5 inches.

The Folding Camera

A folding camera is, in effect, a box camera, the difference being that the lens support is attached to a collapsible bellows which folds into small compass, thus enabling the camera to be made more compact.

The picture of the folding Kodak plainly illustrates the principal features of this type of the small camera which takes pictures from 1⅝ x 2½ inches up to 5 x 7 inches.

The smallest kind are termed Vest Pocket Cameras The complexity of mechanical devices on folding cameras vary with the price. In general, all, with the exception of the Vest Pocket type, are provided with two tripod sockets—for vertical and horizontal pictures; a track on which the lens support can be moved in or out; a finder in which to locate the image; a device in front for raising and lowering the lens; a scale on the running board to permit of setting the lens support according to the estimated distance from the object to be photographed; a release for working the shutter; and in such cameras as the Kodak, a folding lever or leg which permits of setting the camera on a flat surface so that its base board will be horizontal.

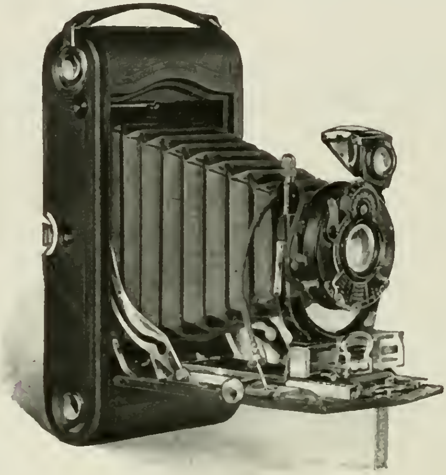

Fig. 9
Folding Kodak

The Eastman Kodak Company has developed a unique improvement in cameras in the nature of an autographic device for recording directly on the film, the data regarding the exposure. There are many other convenient devices on the market which are clearly described in advertising booklets but which we will not take up here.

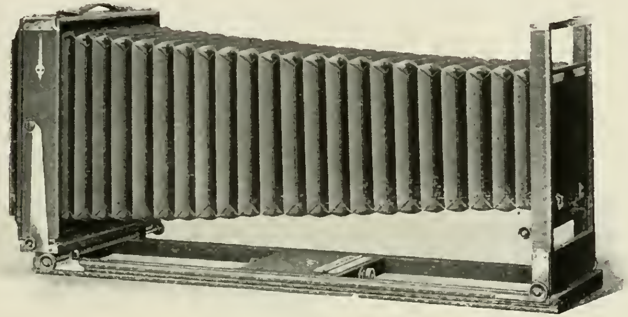

Fig. 10
View Camera, Without Lens

The View Camera

This is a larger type of folding camera. Plate holders are generally employed with it. It possesses the advantage of a ground glass at the back on which the operator can get a very clear image by viewing it under a light-proof cloth. The advantages of this type for landscape and portrait work will be recognized at once. In the first place, all danger of poor focusing is eliminated. In the second place, the picture can be composed to much better advantage.

Other accessories of this type are:

1. The Reversible Back, to enable the operator to make either horizontal or vertical views by merely reversing the back attachment without changing the

position of the camera. In many cameras the same effect is produced by means of a revolving back.

2. The Rising, Falling and Sliding Front, for convenience in registering on the ground glass, in correct proportions, images of objects such as high buildings, and objects taken with the camera in confined places. Bear in mind that whenever the base of the camera is not in a horizontal position, all vertical lines of objects will not be registered as vertical lines on the plate, unless the ground glass is in a vertical position. Therefore, the rising front is a big asset in recording such objects as high buildings, because it can be raised to the very limit without distortion of lines on the plate, provided the ground glass is vertical. This device in conjunction with

3. The Swing-back, permits of correctly registering on the glass, extremes of height. The swing-back is so adjusted that it permits the ground-glass to swing perpendicular regardless of the angle at which the camera is tilted.

4. The Swing-bed is simply the front or bed of the folding camera containing the track on which the sliding-front moves, and the supporting arms or braces which hold this bed in position are so arranged as to make it possible to adjust the bed to any desired angle, thereby enabling the operator to admit as much sky or exclude as much foreground as desired. In this way the body of the camera can remain in any position at all times, and the ground glass will always be perpendicular.

5. The Horizontal Swing is an arrangement for bringing into focus those objects which are nearer to the camera on one side than those on the other.

6. The Double Swing is the combination of the horizontal and vertical swings, by which any of the corrections of the image previously mentioned can be made.

7. The Rack and Pinion is an arrangement for focusing by pulling out and turning a milled head on the side of the bed instead of by sliding the lens support back and forth.

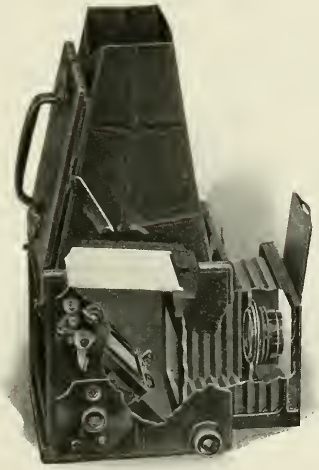

Fig. 11
Graflex Camera

The Graflex Camera

This type of camera, which is somewhat of a combination of both box and folding camera, has revolutionized the art of taking speed pictures and pictures of children, especially indoors. Because of its distinct advantages and popularity, we will quote in detail from the catalog which the Eastman Kodak Company publishes:

"The Graflex is well called 'The camera that does the difficult things in photography—and does them well.' The Graflex, however, does more than that—it makes pictures of ordinary subjects with more certainty than any other type of camera.

The Graflex increases the possibilities of pictorial results. The Graflex user soon learns to appreciate this and to attempt any subject, regardless of time, place or light condition. This certainty of results with the Graflex greatly increases the pleasure of picture making.

Story-telling pictures make a strong appeal and hold the interest, whether faithful records of athletic activities, pleasing poses of children at play, home portraits, indoor studies or pictures made in the soft light of cloudy, rainy days—all easily made with the Graflex.

There is no measuring or estimating the distance between the subject and camera to obtain proper focus of the lens. Simply look into the hood and see the reflection of the subject—full picture size and right side up. A slight turn of a button instantly adjusts the focus—degree of sharpness—of this reflected image as the camera is pointed to properly include the desired detail. All guesswork is eliminated, and the picture is shown just as it will appear in the finished print. The image before the lens is reflected upon a ground glass at the bottom of the hood by a mirror which swings out of the way when the shutter is released for an exposure.

Full illumination and uniform exposure of the film or plate are unique features of the Graflex Focal Plane Shutter, quite as important as the reflecting principle. The Graflex should not be associated with "speed pictures" only, for the optical and mechanical principles that make possible full timed negatives in 1/1000 of a second will also make perfect negatives under adverse light conditions. The Graflex Focal Plane Shutter has a decided advantage over shutters of the usual type, because the lens works at full efficiency throughout the period of exposure—all the light passing through the lens reaches the plate. With shutters of the between-the-lens type the lens is working at its full opening only during a fraction of the exposure, the remaining portion of the exposure period being taken up by the opening and closing of the shutter.

The Graflex Focal Plane Shutter is a long curtain with five fixed openings varying from the full size of the plate to one-eighth of an inch in width. These openings being of a fixed size and metal bound, insure at all times an absolutely uniform rectangular opening and uniform exposure. The curtain moves as closely as possible to the surface of the film of plate.

The length of exposure is regulated by the size of the curtain aperture used, and the tension which regulates the speed at which the opening moves across the film or plate.

Attached to the camera, a shutter speed plate gives the approximate speeds in fractional parts of a second obtained with the various combinations of curtain openings and degrees of tension. With every Graflex is supplied an exposure table for views and speed work, showing at a glance the approximately correct shutter speed and lens aperture to use for every kind of subject.

Picture making with the Graflex is indeed simple. A suitable exposure period is found in the tables and the shutter set. Focusing is done while watching the full picture size image on the screen, and when the desired composition is shown, the exposure is made by a pressure of the mirror release lever. The mirror swings out of the way, releasing the shutter curtain. The mirror comes to rest against an air cushion formed in the top of the camera, effectively preventing all vibration. Another exclusive Graflex feature is the safety device which prevents re-winding of the shutter curtain until the mirror is returned to focusing position, thus preventing premature exposure of the film or plate.

The Focal Plane Shutter in Graflex cameras operates at twenty-four instantaneous speeds from 1/10 to 1/1000 of a second. Adjustments can also be made for slow 'instantaneous' speeds of about 1/5 of a second and 'time' exposures of any duration. The only exceptions are the Press Graflex, where a speed of 1/1500 of a second may be obtained, and the Home Portrait Graflex which has a maximum speed of 1/500 of a second.

Every Graflex is made and adjusted with the utmost precision, subjected to rigid inspection and thoroughly tested before leaving the factory, insuring to the user the greatest possible camera satisfaction.

The Graflex is constructed of mahogany covered with the finest grade Persian Morocco leather, harmonizing perfectly with the rich appearance given by the oxidized metal work and ebonized finish of all visible wood parts. Tripod plates are provided for the use of a tripod when making prolonged time exposures."

There is a wide range of this type of camera—too many by far to elaborate on here. It is a simple matter to secure a catalog in which are described the various makes, including also the stereoscopic, the naturalists, and the cirkut for panoramic work.

Hand Cameras

All cameras described, with the exception of the view camera, are essentially hand cameras, in that they are used in general without a tripod. All of the better grades, however, have tripod sockets to facilitate the making of time exposures.

Portrait Cameras

All view cameras can be used as portrait cameras, and even hand cameras can be used for the purpose, but strictly speaking, portrait cameras are cameras of the view camera type, especially designed for studio or other indoor work, with special tripods or stands and special kinds of lenses.

CHAPTER III

LENSES, SUPPLEMENTARY LENSES, SHUTTERS, AND DIAPHRAGMS OR STOPS

LENSES

A WHOLE book could easily be written on this important subject, but inasmuch as this book is a treatise on how to use the camera and how to make pictures as simply as possible, we shall not go into detail, except so far in as is absolutely necessary to give the beginner a grasp on the very fundamentals.

Let us consider, then, the A B Cs of lensology, and, inasmuch as an intelligent understanding of one's tools in any line of activity results in more pleasure for the participant and better results all around, we will consider for a few minutes a few facts regarding lenses.

How a Lens Forms An Image

Kodakery, a splendid little magazine issued by the Eastman Kodak Company, and obtainable by anyone for a very small fee, covers the subject in a most clear and concise manner; I will quote from it here:

"In order to take a photograph we use a lens which forms an image of the object we want to photograph upon the film.

The simplest lens which we could use would be a small hole. Suppose that we take a sheet of card and make a hole in it with a pin and then, in a darkened room, hold the sheet of card between a sheet of white paper and an electric lamp; we shall see on the paper an image of the lamp filament.

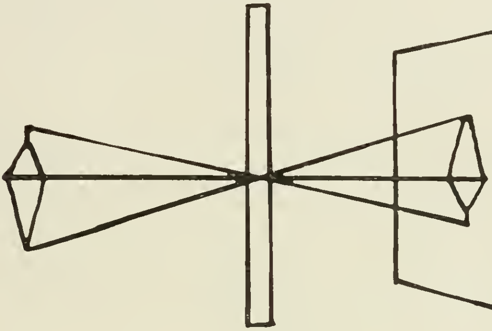

Fig. 12

The diagram shows how this image is produced. A ray of light from each portion of the filament passes through the pinhole and forms a spot of light on the paper and all these spots joining together form the image of the filament.

If we take the lens out of a camera and replace it by a thin piece of metal pierced with a hole made by a needle (a No. 10 sewing needle is about right, and the edges of the hole must be beveled off so that they are sharp), then we can take excellent photographs by giving sufficient exposure.

If the pinhole is about six inches from the film then an exposure of about one minute for an outdoor picture on film will be required. It is necessary, of course, to make a well fitting cap for the lens aperture so that no light will get in except through the pinhole and also to make a cover for the pinhole to act as a shutter for exposing.

But if a pinhole were the only means of forming an image it is very improbable that photography would ever have been developed, since the exposures are so long in consequence of the small amount of light which can pass through the pinhole.

In order to get more light we could try making the pinhole larger but the effect of this is to make the image very unsharp, and even the smallest efficient pinhole cannot give as sharp an image as a good lens.

Suppose we have a small pinhole forming an image of a star thus. (See Figure 13.)

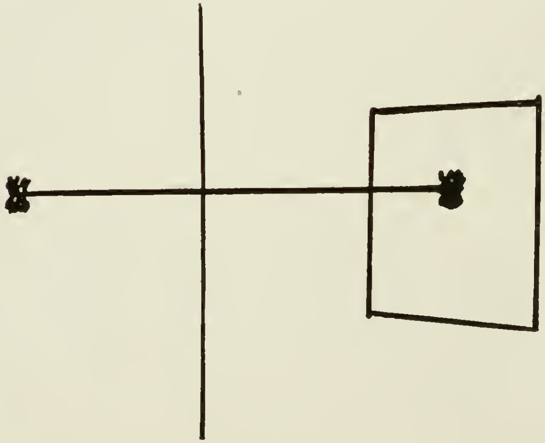

Fig. 13

Now, if we make the hole larger, we shall get a round, spreading beam of light and no longer get a sharp image. (See Figure 14.)

What we want, if we are to use the large hole, is some means of bending the light so that all the light reaching the hole from the star is joined again in a sharp image of the star on the screen, as shown in Figure 15.

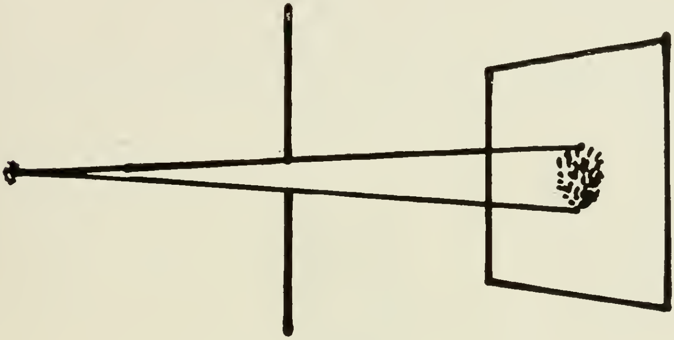

Fig. 14

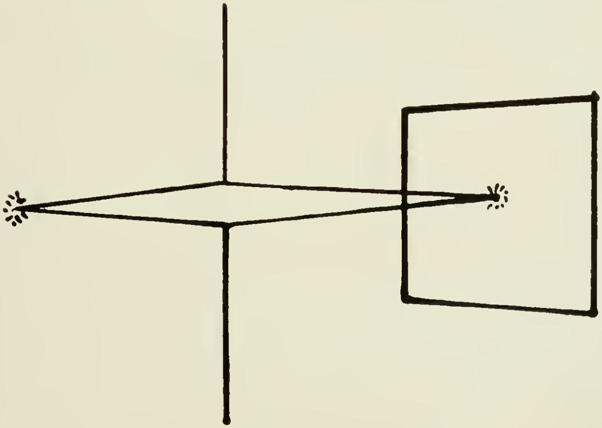

Fig. 15

Now, if a ray of light falls on a piece of glass so that it is not perpendicular to it, it will be bent. There is an interesting experiment that shows this very well.

Take a thick block of glass and place it so that it touches a pin (marked B in the photograph) and stick another pin (A) in the board. (See Figure 16.)

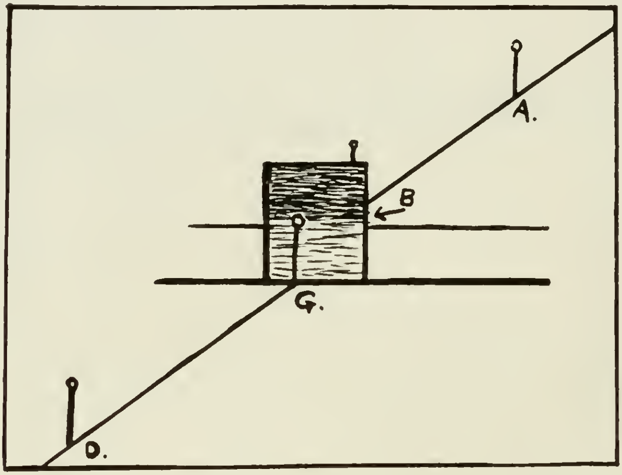

Fig. 16

Now look through the glass and stick a pin (D) between your eye and the glass and in the same line of sight as A and B, and lastly another pin (G) touching the glass and in the same line of sight as the other three. Now, take away the glass and join up the pinholes with the pencil lines. You will find that the line DG is parallel to the line AB but is not in the same line; that is, the ray of light marked by the line AB was bent when it entered the glass and then bent back again when it left it, so we can bend light by means of a glass. If we take a triangular piece of glass (called a prism) we can bend a ray when it enters the glass and also still more when it leaves the glass, thus. (See Figure 17.)

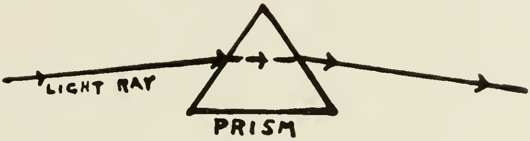

Fig. 17

And a lens is really two prisms stuck together base to base. (See Figure 18.)

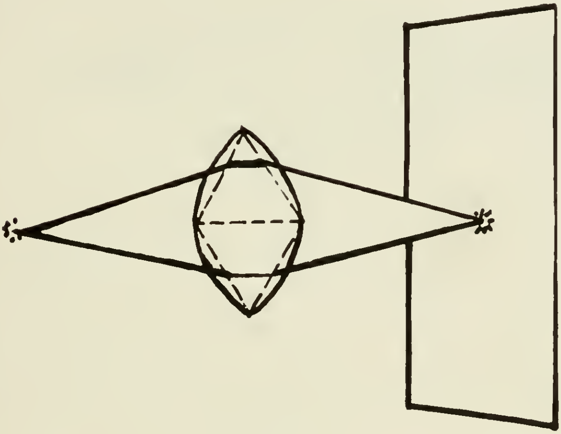

Fig. 18

So that if we put a lens in the hole with which we want to form an image we can do what we wish to and make all the rays from the star join together again in the image of the star. (See Figure 19.)

And this is the purpose of our camera lens—to form an image as sharp as that given by the smallest pinhole and yet much brighter than any pinhole would give.

Now that we have learned the function and action of the simplest form of lens, let us consider what the various types will do, for it is very essential when buying a camera to know something of the most common types and especially the reason why there is such a variation in value.

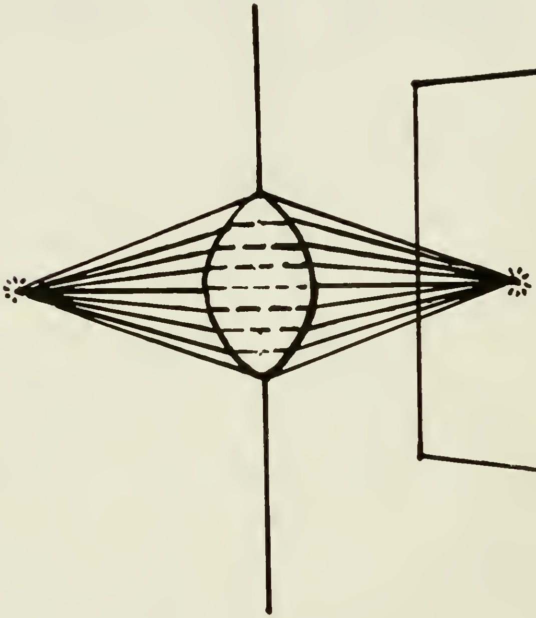

Fig. 19

The reader can well bear in mind that practically every step in increased price of either lens or camera is fully justified by advance in careful workmanship, increased facility of operation, or more versatile performance, and that the higher priced outfits in case of forced sale usually bring a greater percentage of original cost. He who begins with an outfit of limited capacity and continues in photography invariably desires a more flexible equipment. I therefore advise the original purchase of the best outfit which the buyer's means will command, as the most satisfactory and economical course in the end.

The lens is the most expensive and the most important part of the outfit. The quality of work done depends to a vital extent upon the lens, therefore it is a waste of time and a cause of considerable worry for a real enthusiastic beginner to start off with a lens that has no reliable concern back of it. A glance over the advertising pages of the several high class photographic magazines that are on the market today will prove a good guide for anyone not familiar with the leading dealers in photographic supplies—American Photography, Photo-Era, The Camera, and Camera Craft are among the group.

Had the author been "posted" before making his first investment in photographic equipment, his wallet would have been fatter in the end, and his time, wasted in trying to get better results that under the circumstances were impossible, much lessened.

Photographic lenses can be divided into six different kinds, single lenses, doublet or rectilinear lenses, soft focus lenses, anastigmats, wide angle, and portrait lenses. Naturally there are different grades of each kind, as well as variations in make, according to the purpose for which they are to be used.

1. The Single Lens

It is a single convex lens just like the lens in grandfather's spectacles.

There are two varieties of this type of lens: the non-achromatic, and the achromatic. These two terms are often puzzling to the beginner, but very simply explained:

The non-achromatic lens is one which bends the rays of which daylight is composed to different extents, so that the yellow rays which are used for focusing do not come to a focus in the same place as the blue rays which most strongly affect the film, since the blue rays are bent more than the yellow ones.

This lens is generally fitted to simple box cameras, and the cheapest folding cameras of the fixed focus type; its usefulness depends upon the quality of glass used and the degree of skill used in grinding it.

The following diagram illustrates this lens:

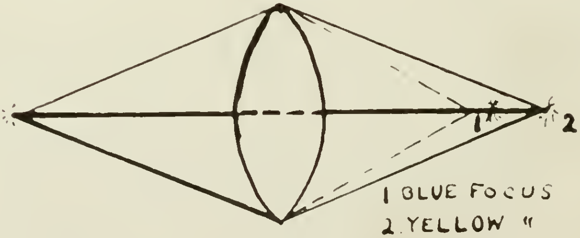

Fig. 20

The Meniscus Achromatic Lens

This lens consists of two different kinds of glass fitted together assuming the shape of a crescent ("meniscus" shaped), but functioning so that the blue and yellow rays are focused at the same point.

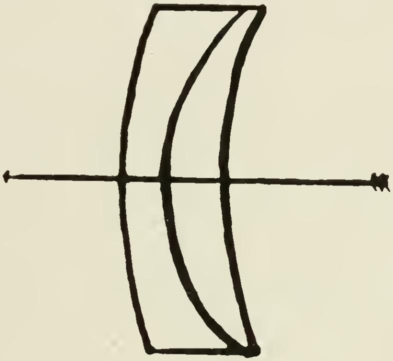

Fig. 21

The advantages of this lens over the non-achromatic is obvious—the first will not focus sharply even in a focusing camera; the second will, provided it is "stopped down" so that only a small portion of the lens is used. The reason for stopping down, that is, excluding the light from passing through the edges of the lens, is that the rays which come through the edges do not focus together as well as those which come through the center, and so the image is not quite sharp if the whole lens area is used.

One unpopular effect of the single lens, even though achromatic, is that of producing slight curvature of the edges of the picture, particularly where vertical lines are included such as sides of buildings, etc.

2. The Rapid Rectilinear Lens

To correct the tendency to produce curvature near the margins of pictures the rapid rectilinear lens was developed—"rectilinear" because it gives straight-line images.

It is in reality a combination of two achromatic lenses so placed that one balances the other in respect to their tendencies to produce false curvature or "curvilinear distortion." It is much more "rapid" than the meniscus, because, having a "focal length" half that of either of the component achromatics with a "stop" of the same diameter, it passes four times as much light and requires only one-half the exposure, and it covers a much wider field of view. Rapid Rectilinears are sometimes known as "Rapid aplanats," "Planatographs," and so on.

This lens is made in the form of a brass tube or "barrel" with an achromatic lens in each end, concave surfaces facing, and with the "shutter" between.

This type of lens belongs to the doublet type. Another advantage which it possesses is that either lens can be used by itself as a view lens, and then gives an image of twice the dimensions of the doublet lens. A single section of a doublet cannot be used,, however, except in cameras having a doublet extension bellows because of the difference in "focal length" of the two combinations.

3. The Anastigmat Lens

Even with the best of achromatic lenses it is impossible to focus sharply at the center and edges of the plate or film at the same time without using a very small stop, or opening, in the shutter; the defect in lenses which causes this is known as astigmatism. It is not only an affliction of the lens, but is unfortunately an affliction of the human sight. In brief, it is an inability of the eye-lens, and the glass lens to bring to a sharp focus at one time lines which run in different directions on a plane surface. So the photographic lens which is not "corrected" for astigmatism will render a series of lines covering the whole surface of the plate sharp in some portions of the image, and blurred in others.

The Anastigmat, meaning "not astigmatic," is a lens of an entirely different kind of glass than that used in achromatics, and one which overcomes the faults discussed even when the maximum amount of light is permitted to pass through, thus it will be observed that two very important attributes of this lens is speed, and sharpness from edge to edge of every portion of the image *in the same plane.* Bear in mind that the same degree of sharpness can be secured with the rapid rectilinear by "stopping down" and thus sacrificing speed by diminishing the amount of light passing through the lens.

Anastigmats require somewhat more care in focusing than the R. R. (rapid rectilinear) type, for, even a slight movement of the focusing screw is sufficient to produce all the difference between definition no better than that of a common lens and the most beautiful, minute sharpness.

It is figured by experts that the anastigmat is from 4 to 7 times that of the R. R. depending on the full aperture of the former. The anastigmat need never be stopped down except to secure increased depth of sharpness, that is, sharpness of foreground, middle distance, and distance. *It is necessary, no matter what the lens, to use a small aperture if a uniform sharpness of the image at all distances from the camera is desired.* This particular phase of the subject will be treated in detail further on under the caption "depth of focus."

The anastigmats most commonly used on speed cameras, such as the Graflex, are the Protar and Tessar, but there are several other lenses of repute on the market, such as the Cooke, Heliar, Ross, Goerz, Dynar, and others.

4. The Soft Focus Lens

Very few beginners are at all interested in results as produced by a soft focus lens, for appreciation of such pictures comes only with experience in the photographic world or in other fields of work classified under Art.

In brief, a soft focus lens is the extreme opposite of an achromatic in that, it is impossible to produce a sharp image with it. For portraiture and artistic photography, it is ideal for giving atmospherical effects, a beautiful roundness or "standingout" effect.

Such lenses may be either single or double. Examples are the Struss "pictorial" lens and the Smith "soft focus" in the single lens class, and the "Verito Diffused Focus" lens in the doublet class.

5. The Wide Angle Lens

This is a lens that will produce an image on the plate covering an angle of view larger than 70°. Such a lens is constructed much the same as a rectilinear lens, but the two achromatic lenses which form the combination are mounted more closely together.

The wide angle lens is especially desirable for photographing interiors.

6. The Portrait Lens

These lenses are also very similar in construction to rectilinear lenses, but are so made that they are very rapid. They are not to be recommended however, for anything except portrait work, as all other good qualities are sacrificed for speed.

Very good portraits can be made with a rapid rectilinear or an anastigmat lens by a slightly prolonged exposure.

SUPPLEMENTARY LENSES

The Portrait Attachment

This is an efficient little device in the form of an extra lens which usually slips over, or is screwed into the outer end of the lens barrel. With it, you can work close up to your subject in the same manner as you would with a regular portrait lens. It is a very useful device for one who possesses a Kodak or similarly made camera.

The Duplicator

This is an arrangement whereby one portion only of the plate can be exposed at a time, thus enabling the operator to picture the same subject in several different postures on one plate.

The Enlarging and Copying Lens

This lens when attached to the lens of the camera, will enable one to photograph small objects or pictures so that the copy will be as large or even larger than the original.

When copying, examine the image on the ground glass, then focus by pushing the entire camera to or from the object until a sharp image is obtained on the ground glass, varying the bellows extension according to the size of copy desired.

The Telephoto Lens

This attachment is used for producing images of distant objects or views on a larger scale than can be secured with an ordinary lens. Focusing should be done with a large aperture (stop), and the exposure made with a smaller stop.

The Color Filter

This attachment is used for producing correct color values on the finished pictures. It is so constructed that it absorbs the violet and blue rays of light, which act most rapidly on the sensitive plate, and thus prevent these colors from appearing absolutely white in the resulting picture.

With this device, clouds can be reproduced in far more correct values, and in flower photography it is indispensable to good results.

Its use requires an increase in exposure of from six to twenty-five times, and it must be used with specially prepared plates or films in order to secure the best results. No camerist who possesses a focusing camera and loves beautiful landscapes, flower studies, etc., should be without this attachment.

The Kodak Sky Filter

This is a modified form of the Color Filter in that but one-half of it is prepared for producing color values in the finished picture, the object being to give the owner of the snap-shot camera a device for securing correct sky values, the increase in exposure being only about twice that of the normal exposure.

Even with the ordinary film, this attachment is a wonderful asset for it enables the user to increase his sky values to a very pleasing extent.

The Lens Shade or Hood

Ofttimes it is necessary, or expedient to aim the camera towards the sun. In such instances the sun's rays must be prevented from falling on the lens, otherwise fogging of the plate will result. To prevent this, a cylinder of black leather, cardboard, or even paper should be made, about two inches long, to fit over the lens barrel. If a tripod is used, efficient shading can be done with a hat, or plateholder slide, and so on, by holding it so as to cut off the direct rays, but high enough so that it will not interfere with the view desired.

All of the so-called supplementary lenses can be secured in sets, or by the piece. All can be easily adjusted to the regular lens. A set is really an inexpensive yet valuable addition to an outfit, for with it, one is equipped to meet almost any emergency requiring the attention of the photographer.

In using any of these attachments, bear in mind that simple lenses introduce aberrations into an optical system, therefore a medium or small store of them must be used to secure satisfactory definition.

The Wide Angle Attachment

This attachment needs no explanation here, as it is but a substitute for the wide angle lens previously discussed.

Care of the Lens

Too little attention is given even by experienced photographers to keeping the lens clean, for whether the lens is a cheap one or one of the best, if it is dirty, it will not make a brilliant picture.

Finger marks on lenses are one of the worst enemies of good pictures, so keep the fingers off. Examine it frequently, and remove dust with a camel's hair brush. When it is necessary to apply moisture, breathe on it and wipe it gently with a clean, well-worn linen handkerchief that has become soft. Never use alcohol, acid, or any kind of polishing material on it.

To get at single lenses that are mounted behind the shutter, wrap a piece of handkerchief around the head of a small, soft, pencil-shaped brush after the shutter has been opened, as for a time exposure.

Never leave the lens exposed for any length of time to the direct rays of the sun, or where it can be affected by excessive moisture.

SHUTTERS

The shutter is the device, by means of which the opening to admit light through the lens is opened or closed. There are many varieties, almost every manufacturer having a different style.

Some are placed in front of the lens; some between the lens; and others behind the lens. In general there are five types.

The Rotary Shutter

This is used in front of the lens in box types and cheaper folding cameras—cameras fitted with a single lens. This shutter is simply a circular disc of black metal, containing a small opening which passes in front of the lens when released by a spring, thus permitting light to pass through the lens.

The Single Valve Shutter

This type is provided with a dial and a pointer, the dial being marked T, B and I, T being the mark at which the pointer must point for time exposures; B for bulb exposures, and I for instantaneous exposures.

The Double Valve Shutter

This type is similar to the single valve shutter, but possesses a greater range of movement, for in addition to the T and B markings, it has a greater number of markings providing for definitely timed exposures from one second to a very small fraction of a second.

Single and double valve shutters are operated by bulb or cable release attachments which when squeezed or pushed release the shutter which is set for automatic action either by adjusting the pointer indicating the amount of exposure to be given, or by pulling down a lever on the left after adjusting the pointer.

For T, or time exposures, one pressure of the tube opens the shutter; a second pressure closes it.

For B, or bulb exposures, one pressure opens the shutter, which will remain open until the pressure is released.

For I, or instantaneous exposures, and for any of the definitely marked exposures one pressure is sufficient to properly operate the shutter for the indicated exposure.

The Automatic Shutter

This type of shutter may be of either the single valve or the double valve type, and is without any visible valve. It is always ready for exposure without having to be "set."

The shutters as developed by the manufacturers of the several popular folding cameras that are on the market today are wonderful improvements over the older types. A description of one or two here might be of interest and help to the reader.

The Kodak Ball Bearing Shutter

It is automatic and does not require setting. It is made up of a number of leaves which work on ball bearings, and which open and close in a star-shape aperture, thus admitting the maximum amount of light. It is operated by cable release or by finger release, and is made by the Eastman Kodak Company.

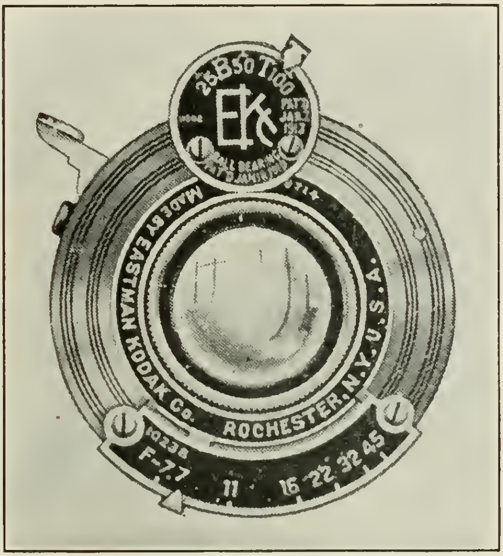

Fig. 22
Kodak Ball Bearing Shutter

The Optimo Shutter

This shutter is one of the most accurate shutters for use with fast anastigmat lenses. It has remarkable precision, smoothness, ease in action, and sufficient speed to photograph rapidly moving objects. It is made up of five leaves which revolve when the exposure is being made—opening and closing as well—in a star-shaped aperture. It has eight indicated speeds in addition to the usual "bulb" and time actions, varying from one second to 1/300 of a second. It is of the setting type, and has a cable and finger release.

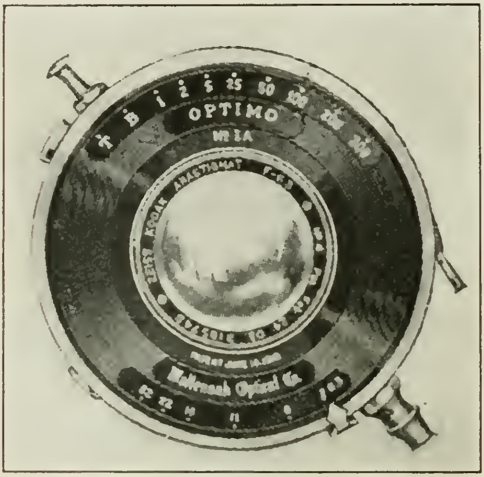

Fig. 23
Optimo Shutter

The Focal Plane Shutter

This type of shutter is one of the modern developments which has made high speed cameras possible. It has a decided advantage over shutters of the usual type because the lens works at full efficiency throughout the period of exposure—all the light passing through the lens reaches the plate. The illustration given here through the courtesy of the Eastman Kodak Company readily explains the truth of the last statement.

The Graflex focal plane shutter is a long curtain with five fixed openings varying from the full size of the plate to one-eighth of an inch in width. These openings being of a fixed size and metal bound, insure at all times an absolutely uniform rectangular opening and uniform exposure. The curtain moves as closely as possible to the surface of the film or plate. The length of the exposure is regulated by the size of the curtain aperture used and the tension which regulates the speed at which the opening moves across the film or plate.

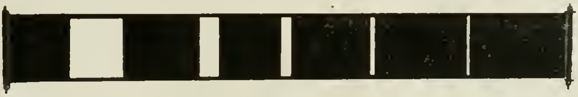

Fig. 24
Graflex Focal Plane Shutter

With this type of shutter it is possible to make exposures as fast as 1/1500 of a second.

DIAPHRAGMS OR STOPS

A camerist may know little or nothing about the technical features of the various kinds of lenses and yet secure good pictures, provided he is somewhat familiar with the principles of diaphragms, or stops, or still simpler, openings which permit the light to pass through the lens whenever the shutter is operated. It is also quite essential that he know the relationship which exists between the stop and the speed of the shutter, otherwise he will be undertiming or overtiming his films a good part of the time.

On most cameras the stop is regulated from outside the lens barrel by means of markings usually at the lower part of the front of the shutter and by means of a lever. (See Figure 22.) In other cameras, box type usually, stops consist of holes in metal plates which are slid back and forth, the stop used depending on the strength of light and the exposure desired.

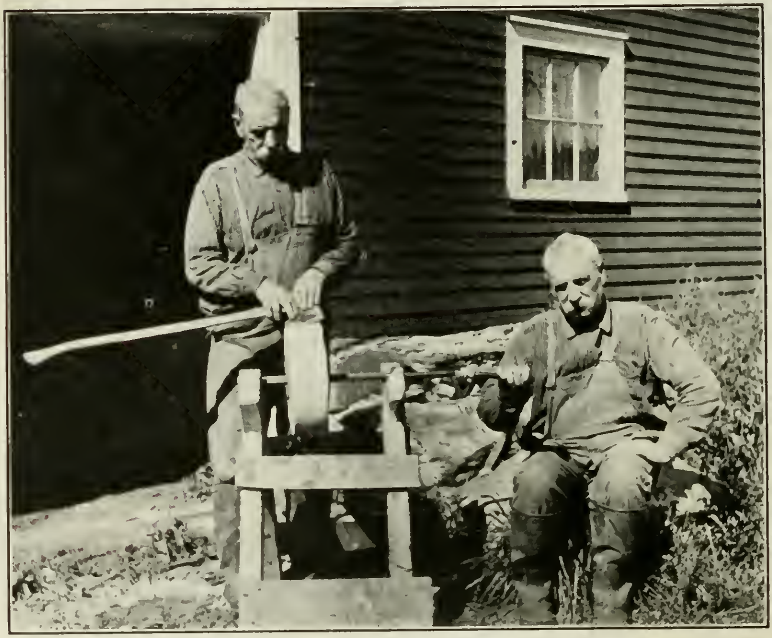

Fig. 25

Twins? Made with a duplicator

The diaphragms first mentioned are known as Iris

Diaphragms. The markings, such as U.S. 4, 8, 16, etc., or F6.3, 7.7, 8, 11, etc., indicate the proportionate amount of light admitted.

The use of diaphragms can best be illustrated by an experiment. If you were to set up a camera containing a ground glass, and open the diaphragm to the largest aperture, and focus sharply upon an object about twenty-five feet away, upon observing the image upon the ground glass, you would note that objects quite close to the camera, as well as objects a distance beyond 25 feet, were blurred. Then, by gradually making the diaphragm smaller, you would note that the image would become less bright, due to the decrease in light passing through the lens, and that the blurred parts would become sharper as the opening became smaller. The smaller the stop, the sharper and clearer the picture, but the longer would be the required exposure. It therefore becomes practically impossible, except under very unusual conditions, to make a snap-shot with a diaphragm smaller than F-16 or U.S. 16.

Size of Diaphragms—Explanation of U. S. and F. Systems

The characters U.S and F are used to indicate two different systems—one, the F, referring to the relation of aperture to focal length, an F-8 opening meaning that the diameter is ⅛ of the focal length, focal length being the distance from the center of the lens to the ground glass or film when the camera is focused on an object 100 feet away; the other, the U.S. (uniform system), being a system based on the areas of the openings, each next higher number having half the area of the preceding number and therefore requiring twice the exposure. For example: Stop No. 8 will require twice the exposure of stop No. 4, and vice versa—in other words, if 1/50 of a second be correct for stop U.S. 4, then with the same light conditions and stop U.S. 8, 2/50 or 1/25 of a second would be required. The two systems are easily compared:

F-4	equals	U.S. 1
F-5.6	"	U.S. 2
F-6.3	"	U.S. 2.5 (approximately)
F-8	"	U.S. 4
F-11	"	U.S. 8
F-16	"	U.S. 16
F-22	"	U.S. 32
F-32	"	U.S. 64
F-45	"	U.S. 128

The U.S. system is quite common to the R. R. lenses, while the F system is more common to anastigmat lenses.

COMMON OPTICAL TERMS DEFINED

1. Depth of Focus

Depth of focus is the extent to which both near and far objects can be brought into focus sharply at the same time. It is an important qualification, for the better the lens, the larger the stop which may be used and still obtain a sharp picture throughout, and the larger the stop, the shorter the exposure required. Depth of focus can be obtained with almost any lens by using a small stop, but this means a long exposure, thus eliminating the possibility of snap-shots.

Great depth of focus is not as important as the average amateur considers it, because as a rule, a picture will be rather better for having the unimportant parts less sharply defined than the principal object.

Universal Focus

When the bellows is so set that the indicator points at 100 on the focusing scale which is attached to the base board, we speak of setting it at Universal Focus, or point of infinity.

Focal Length

The distance from the ground glass to the lens when set at Universal Focus (100 feet) is the focal length of the lens.

Stop

The aperture which regulates the amount of light passing through the lens; it is termed F-8, F-11, or U.S. 8, U.S. 16, etc.

Spherical Aberration

Failure of the lens to register sharply at its full opening.

Convertible Lens

One in which the two component glasses (front and rear elements) can be used as separate lenses.

Curvature of Field

A defect in a lens showing sharper definition on the center of the plate than at the edges.

Equivalent Focus

The distance from the optical center of a lens to the ground glass when focused on a distant object.

Doublet

A lens composed of two separable lenses.

Focal Aperture

If the focal length is divided by the diameter of the largest aperture the quotient is the approximate focal aperture.

Lens Speed

The F value of a lens is the relation that exists between the diameter of its effective aperture and its focal length. If, for instance, this diameter is 1 inch and the focal length is 8 inches the F value is 1/8, commonly written F-8.

In speaking of the so-called "speed" of a lens we refer to the F value of its largest stop. The speed at which a lens works is determined by the amount of light that passes through it, and while the amount of light that passes through a lens depends on several factors, some of it being absorbed, and some reflected by the lens, yet for practical purposes we regard it as being chiefly determined by the F value of the stop used. The larger the stop the more light the lens will pass and the shorter the exposure that need be given.

The largest stop on a meniscus lens is smaller than the largest stop on a rectilinear—the largest stop on a rectilinear being F-8 (U.S. 4). An F-7.7 anastigmat is nearly 8 per cent. faster than a rectilinear, and an

F-6.3 anastigmat is about 62 per cent. faster and an F-4.5 anastigmat (which can be fitted to the No. 1 Autographic Kodak Special, the No. 12 Premo and to all models of Graflex cameras) is about three times as fast as a rectilinear, but, it must be remembered that when any anastigmat is stopped down to, say, F-8, it works at F-8 speed and then requires the same exposure that any other lens requires with stop F-8. The safe rule is, to give the same exposure with all kinds of lenses when the stop used on each has the same F value. When you wish to give shorter exposures with an anastigmat than with other lenses you must use the anastigmat with a larger stop than you would use with other lenses.

CHAPTER IV

TAKING THE PICTURE

IF there is any one phase of photography most important of all it is that of making the exposure. This process in itself involves several important steps, such as estimating the distance, or focusing; judging light conditions; judging the light reflecting qualities of the subject to be photographed, and finally estimating the stop to use and the time to give.

This simple yet vital process represents the border line between your ability to make good or poor pictures. It represents the three R's of your photographic education, and should be given your closest attention until you have mastered it, to a large degree, in its application to the most common subjects which you will photograph from day to day.

The best possible advice that I can give you in this whole book is to be given you right here. It is advice garnered from years of experiment and from the testimonials of scores of camerists who have learned to make good pictures—they will all tell you the same story, and your disposition to heed it or disregard it will be the decisive factor in determining whether you will be one more of the "thousand and one" who is satisfied with getting one good negative in a score, with its accompanying waste of time and money, or whether you will be one of the "one in a thousand" who starts right and progresses rapidly in the art of making satisfying pictures.

In order to make my point more clear, let me illustrate briefly the two methods of procedure to which I refer.

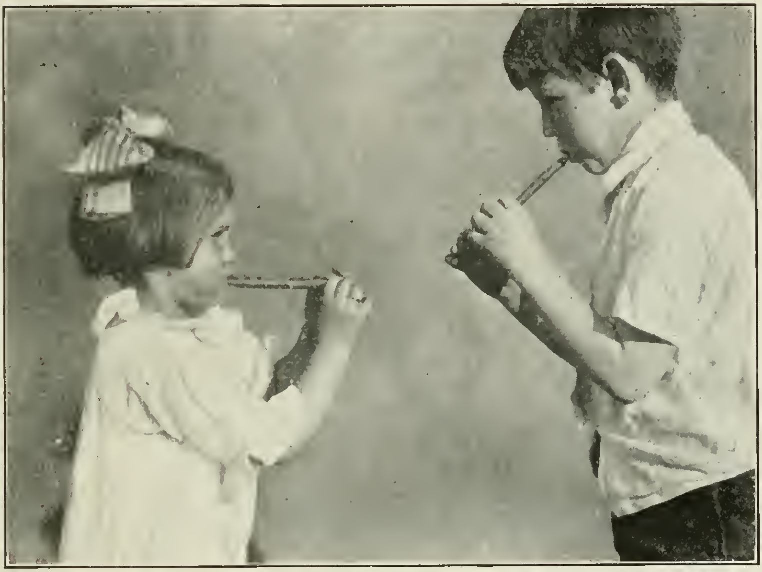

Fig. 26

The Contest—Result of lowering the camera as the snap was being made. It should have been pressed firmly against the waist and the breath held as the button was pressed

Mr. A buys a camera, it matters not what kind. He gets a book of instructions with it, and plugs away industriously at learning how to operate its mechanical phases. He scans, less attentively, the data regarding stops, lighting, exposure, etc., noticing that an exposure guide is emphasized as a very necessary adjunct to his equipment, and then without securing such a helpmate, proceeds to "shoot" all kinds of subjects under all kinds of conditions. He does not check each step as he should and could very easily, consequently he secures a set of films, part of which are out of focus; part of which are blank; several "two on one" combinations and many undertimed samples.

Mr. B proceeds entirely differently. He reads his instructions carefully, underlining certain information and experimenting a lot in operating his camera before he takes a single picture. He buys an exposure guide or meter and even makes out a pocket memo of the various steps which he should follow in making an exposure. Then he selects one or two simple subjects, such as a house or a landscape or a human subject that is not likely to be constantly moving all over the lot—in other words, a person who will appreciate his difficulties.

He will confine his early efforts to the subjects, under different light conditions, until he is satisfied that he knows when to use stop F-8 or F-11, and when to give an exposure of 1/25 or 1/50. As he makes each exposure he will make in a little note book, notations as to light conditions, time of day, stop and exposure, so that when he is to take similar pictures, these notes will serve as his guide. If he can, he will have a model of the results that he is after, and he will keep at it until he finally turns out a negative just as good as his model. Such methods as these will surely bring success in the end. This principle is similar to that of placing money at interest; the results do not materialize immediately, but he eventually has something to show for his patience and forethought.

With these two systems in mind let's proceed, on the basis that it is far better to work along the lines of Mr. B's methods.

For simplicity's sake, I shall treat this chapter under five headings: Loading the Camera; Focusing; Making the Exposure; Making the Note-book Record; and Picture-taking.

1. Loading the Camera

(a) The Hand Camera and Films

Two common cameras of this type are the Eastman Kodak and the Ansco Speedex, but practically all hand film cameras operate on the same principle. The advantage of this type over the plate camera is that it can be loaded in daylight. The film is put up in light-tight rolls, and, extending the full length of the strip of film and several inches beyond each end is a strip of duplex paper, red on one side, and black on the other, which, in connection with the flanges on the spool, forms a light-proof cartridge.

After inserting the spool and threading up the paper the camera is closed and the key turned until the paper has been partly reeled off and the sensitive film brought into place in the focal plane. The duplex paper runs with and behind the film, and at proper intervals is marked with the number of the section of film, 1, 2, 3, etc. In the back of the camera is a small red window through which the figures appear as the key is turned. Press the key slightly and turn slowly to the left, watching the little red window at the back of the camera. When 15 to 18 turns have been given a hand pointing toward the first number will appear, then turn slowly until the figure 1 is in the center of the red window.

The warning hand appears only before No. 1. These figures show just how far to turn the key and how many exposures have been made. After all the exposures have been made, a few extra turns of the key entirely covers the film with duplex paper and the camera may be unloaded in daylight.

It is all as simple as threading a needle, simpler for a man, and with each camera a manual is supplied explaining each step. The amateur must bear constantly in mind, however, that the paper must be kept tightly rolled about the film all the time until it is in place in the camera and the camera closed, for should the film be exposed to daylight for even a hundredth part of a second it would be ruined.

In the 3½ x 3½, 3¼ x 4¼, and 4 x 5 sizes, Film Cartridges may be obtained for six or twelve exposures; 3¼ x 5½ may be had in six and ten, and 4¼ x 6½, and 5 x 7 in six exposure cartridges. The Autographic Film may also be obtained in rolls of two and six exposures in the 2¼ x 3¼; two, six and twelve in the 2¼ x 4¼; two, six and ten in the 2⅞ x 4⅞; two, six and twelve in the 3¼ x 4¼ and two, six and ten in the 3¼ x 5½ sizes.

(b) The Plate Camera

For loading with glass plates a dark-room is essential, that is, a room from which all white light has been excluded. Provide also a dark-room lamp, and a shelf or table on which to work. Remove the dark slides from the plate holders, and, having closed every avenue for the entrance of white light, and lighted the dark-room lamp, open the box of plates.

Take one of the plates from the box and put it in the holder face up, handling the plate by the edges. (The face is the dull side.) Insert the dark slide with the word "exposed" or with the black side of the dark slide handle next the plate. Now turn the holder over, if it is a double holder, and load the other side in a similar manner. When all the plate holders have been filled, close up the remaining plates in a box, wrap them up securely or put away in a dark drawer.

(c) The Premo Film Pack

By use of the Premo Film Pack the ordinary plate camera is transformed into a daylight loading film camera with the advantage of focusing on the ground glass the same as when using plates. This pack consists of twelve flat cut films packed together in a light-proof paper case. Attached to each film is a paper tab, the end of which is numbered, thus showing just which film is in a position for exposure. The method of using this pack is extremely simple, as the only movement necessary in placing a film in position for the next exposure is simply to pull out a tab.

In the narrow slit, through which the slide is pushed into the holder, there is a valve which closes after the slide is drawn and prevents any light coming in, which would of course ruin the plate. Now, in replacing this slide in the holder, it is very natural to start it cornerwise, as it will probably go in easier that way, but just as soon as the corner of the slide touches the valve it opens it *clear across* and from the time that the corner opens the valve until the whole of the slide is in the slit, the light has a chance to come in, and very promptly does so, and then you wonder how that film was spoiled. In putting the slide into the holder, it must be started *squarely* and when you have it once started, it must be pushed clear in *quickly*.

2. Focusing

(a) Box, and Other Fixed Focus Cameras

On the side of this type of camera near the front end you will see a small rectangle of glass, in which will appear an exact copy or reproduction of whatever may happen to be in front of the camera. If a bright light is shining directly into this "finder," it may be difficult or even impossible to see the picture there, but by shading it with the hand, the image is easily seen.

Locating the image in the finder, bearing in mind that it is reversed, i. e., the left side of the view as you face it becomes the right side of the image in the finder, constitutes what might be termed focusing a fixed focus camera.

(b) Folding Cameras of the Kodak Type

In using a folding hand camera, such as the Kodak or Ansco, the process of making an exposure is somewhat more complicated than with a simple hand camera, as there are more adjustments to be made. The finder is used as with the fixed focus type, but the bellows is set by a "focusing scale" on the left side of the base board, according to the estimated or measured number of feet that you are away from the subject to be taken.

It is needless to go into detail here in regard to such devices as direct view finders, double system of scales, adjusting the rising and falling front, etc., for with every camera which you buy you can secure a booklet of descriptive matter, free, which goes into detail with regard to your particular camera.

(c) Folding Cameras For Glass Plates

Place the camera on a tripod, pull out the bellows; set the shutter on T and press the bulb. The shutter will now stay open. Open the back of the camera so that you can see the ground glass. Throw a focusing cloth over your head and the camera, taking care to exclude all light except that which comes through the lens. By moving the lens support forward and backward, and keeping your eye on the ground glass, an inverted image will appear thereon which can be made as sharp throughout as you like by "stopping down," i. e., making the lens aperture smaller.

After securing the desired definition (degree of sharpness), lock the bellows by turning down the thumb screw beneath the lens, or by whatever other adjustment may be on your particular camera. In focusing, have your eyes about a foot away from the ground glass.

Close the shutter, and readjust according to the exposure to be made, details of which will be taken up under "Making the Exposure."

(d) Graflex Cameras

This is the simplest type of all to focus as it is done by working the bellows back and forth by means of a milled head, the meanwhile studying the image by looking at the ground glass on top of the camera through a special chamber.

3. Making the Exposure

In brief there are two general classes of exposures according to lighting conditions and subjects; they are, "instantaneous" and "time."

(a) Instantaneous Exposures or Snap-shots

A concise and clear description of this process is given by the Eastman Kodak Company and it is applicable to all types of so-called snap-shot cameras. I will quote their article verbatim: "Instantaneous exposures, or 'snap-shots,' as they are more frequently called, are usually made while the camera is held in the hand and are about the first thing that the amateur attempts. Some learned writers deprecate this, but as snap-shots are the simplest exposures to make and ordinarily the simplest to develop, because most likely to be correctly timed, we believe the amateur should begin his photographic career with this class of work.

Before making an exposure, either time or instantaneous, be sure of four things:

FIRST: That the shutter is adjusted properly. (For time or instantaneous exposures as desired.)

SECOND: That the diaphragm lever is placed at the proper opening.

THIRD: That an unexposed section of film is in position, or that an unexposed plate is in position and that the dark slide has been removed.

FOURTH: Unless the camera has a fixed focus see that it is properly focused on the principal object to be photographed.

When making instantaneous pictures the object must be in the broad, open sunlight, but the camera should not be. The sun should be behind the back or over the shoulder of the operator.*

Set the focus by placing the pointer over the figures in feet, on the index plate nearest the estimated distance of the principal object to be photographed.

It is not necessary to estimate the distance with any more than approximate accuracy. For instance, if the focus is set at 25 feet (the usual distance for ordinary street work), the sharpest part of the picture will be the objects at that distance from the camera, but everything from about 15 to 35 feet will be in good focus. For general street work the focus may be kept at 25 feet, but where the principal object is nearer or farther away the focus should be moved accordingly. . . .

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*NOTE—Effective pictures may frequently be made by working toward the sun, shading the lens to keep out direct sunlight when so doing, but the amateur should not attempt such work at the start.

It is imperative that a large stop be used in making snap-shots. With most cameras the largest stop must be used under ordinary conditions with bright sunlight. This is the case with all of the single lens Kodaks. With the double lens Kodaks use U.S. 8 or F-11.

This size stop must be used for snap-shots, except where the sunlight is unusually strong and there are no heavy shadows, such as views on the water, or extremely distant views or landscapes with clear sky overhead, when the smaller stop may be used.

The smallest stop must never be used for snap-shots or absolute failure will result.

Hold the camera steady and locate the image in the finder. This gives the exact scope of view and shows on a reduced scale just what will be in the picture—no more, no less.

Making the Instantaneous Exposure.

Hold the camera firmly against the body, and when operating the cable release or pressing the exposure lever, hold the breath for the instant. The least jar will cause a blurred negative.

The camera must be held level.

If the operator attempts to photograph a tall building, while standing near it, by pointing upward, thinking thereby to center it, the vertical sides of the building will appear as oblique lines in the picture.

The operator should hold the camera level, after withdrawing to a proper distance, as indicated by the image shown in finder. Some cameras are equipped with a rising and sliding front to assist in taking the tops of tall buildings.

(b) Time Exposures Indoors

To make a time exposure, place the camera on some firm support, like a table or tripod, focus carefully (this, of course, does not apply to fixed-focus cameras), on the principal object and locate the image in the finder. If using a table or chair for a support, be sure to place the camera not more than two or three inches from the edge so as to avoid including part of the table or chair in the picture.

When using plates, or a camera using a Premo Film Pack Adapter, the focusing may be done on the ground glass if desired. The plate holder or adapter being removed and the shutter opened, the image will be seen (inverted) upon the ground glass. Cover the head with a focusing cloth of some opaque material and look on the ground glass, not through it. Focus by moving the lens back and forth until the picture is sharp. Then close the shutter, insert plate or roll holder and proceed as before described.

If the light is so poor that the image is seen with difficulty, the focusing may be done with the largest stop and a smaller one placed in position afterwards.

Set the shutter, and, all being in readiness, press the push pin at the end of the cable release, or press down the lever, as the case may be, to open the shutter. Give the proper time (using a watch if more than two seconds), then close the shutter.

As a precaution when using a plate holder, when withdrawing or replacing the slide, protect the holder from the rays of the sun by shading it in some manner, either by making use of some shadow, or by covering it with the cloth."

I again wish to emphasize the importance of consulting a card containing a list of necessary steps until you are sure of yourself. For explicitness, here is a dummy.

Steps to Observe

1. Focus, setting pointer on correct scale figure.

2. Close shutter if plate camera is used, and set for proper stop and exposure, using notes or guide.

3. Remove slide, if using plate holders, protecting holder from sun.

4. Shade lens from sun.

5. Make exposure.

6. Replace slide, if using plate holders, protecting holder from sun, and make sure that the slide indicates "exposed."

7. If roll film is used, turn next film into position before closing camera. (This is to avoid having the film slide in contact over the folded bellows, an action which would probably scratch the film.)

8. If shutter is open after viewing a subject on the ground glass and you have decided not to make an exposure, be sure to close it before putting the camera away.

9. If Film Pack is being used, be sure to pull out the tab immediately after taking a picture and replacing the slide.

4. Making the Notebook Record

One of the handiest adjuncts to any photographic equipment is the Welcome's Exposure Guide, previously mentioned, for in addition to a lot of valuable information in general, and a very efficient guide to proper exposure under all conditions and with all kinds of films and plates, it contains a splendidly arranged section for recording data regarding exposures. But whether you possess this, or simply a note book, form the habit of making a record of your exposures, for it will be of constant use to you as a reference. A convenient system to use is as follows: A dummy record is given.

Date	Time of Day	Light Conditions	Plate or Film	Stop	Exposure	Subject
July 17	3 P. M	Sun	Eastman Film	F-8	1/75	Our Home

The Autographic Kodak used with the Autographic Film Cartridge offers the great advantage of making the date and title a part of the negative—and at the time. It forms an indisputable record that will be appreciated more and more as the years go by. Many of our pictures will tell the "where" and "who" but the more important question "when" can only be guessed at. Even when the title of a picture is obvious, the date should always be put on as a matter of record for future certainty and satisfaction.

The Autographic Kodak has a spring door in the back, which covers a narrow slot through which the titling is done (with stylus provided for the purpose) on the red paper protecting the film. This slot is so placed that the title appears in the margin between the exposures, but if it is desired to place the title on the picture itself, a slight turn of the spool key will bring it into that position. If two lines of data are to be written, one can be placed in the margin and the other on the picture, or both may be written on the picture, if so desired. Of course the lower line must be written first. Such titling would appear on the bottom of an upright picture, or at the left-hand end of a horizontal picture.

The Autographic Film Cartridge differs from the regular N. C. Film Cartridge in this respect. A thin red, instead of the familiar red and black (duplex) paper is used. This red paper, in itself, is not fully light-proof, but between it and the film is a thin strip of black displacing tissue. This tissue serves the double purpose of light-proofing the cartridge and of permitting the recording, by light, of writing upon the film. When the data has been written on the red paper and printed (by exposing with the door open to the sky for from two to five seconds) the image is photographically impressed on the film and appears when the film strip is developed. In making the prints the title may readily be shown upon the print itself, the letters appearing in white upon a black background in the margin, or it may be omitted from the print, remaining, however, as a permanent record for reference in the negative.

To the tourist, to the keeper of the family album, to the careful photographer who wants a record of the conditions under which his pictures were made, to the surveyor, the contractor, the engineer, the Autographic Kodak marks the most important advance that has been made in photography in a score of years.

5. Picture Taking

Picture taking in the broadest sense implies a tremendous range of operation with the camera, but inasmuch as my primary purpose is to teach the beginner the rudiments of the art of making pictures, I shall devote this section, not to making all kinds of pictures under all kinds of conditions, but instead, shall speak only of the method of getting a common every-day sort of picture on the film or plate. Further along we will discuss the various classes of photographic possibilities, such as snow photographs, flower photographs, children photographs, and so on.

Let us consider therefore for the present, picture taking under two headings, (1) pictures in the sun, and (2) pictures in the shade.

1. Pictures in the Sun

As we have already taken up the methods of operating the various cameras for snap-shots and time exposures; we are now most vitally interested in what positions to choose and what exposure to give.

It is so simple to secure a correctly timed, and therefore the earmarks of a splendid negative on the "first crack out of the box" by going about it properly, and yet so easy to spoil the whole procedure by simply choosing an unfavorable viewpoint or by disregarding the precautions given in regard to operating the camera. Let's do it right at the start!

There are, of course, subjects everywhere for you, but it is best for you to begin on a simple well-lighted landscape, street scene, building, or a person who will pose for you. By all means steer away from attempting pictures of moving objects at the start, for unless you do, your pictures will not only be unsuccessful, but your discouragements will multiply in proportion to your attempts.

For the sake of something definite, let us proceed to take a picture of a simple landscape containing a few trees not closer than 75 feet. The first and most important consideration is the angle of light. The majority of instruction books on taking pictures favor a position with the camera which brings the sun at the operator's back. There is no need of an elaborate explanation of the "why" of this procedure, it is simply that the stronger the view is lighted, the less danger of under-exposure, i. e., an exposure in which the highlights (lighter tones) are exposed sufficiently to give detail while the darker and more dimly lighted parts, such as the shadows, are not exposed long enough to show detail on the negative and thus print out simply as dark masses.

The method is a safe one to follow except that you need not go to quite that extreme. Let's choose to stand so that the sun is not exactly behind us but rather at one side, for it is much more desirable to have at least some shadow in the view, otherwise the result will tend toward flatness (the same tone throughout).

The other extreme is such a position that the sun is so far in front that, unless the lens is protected, the sun's rays will pass through it and thus cause a fogged plate

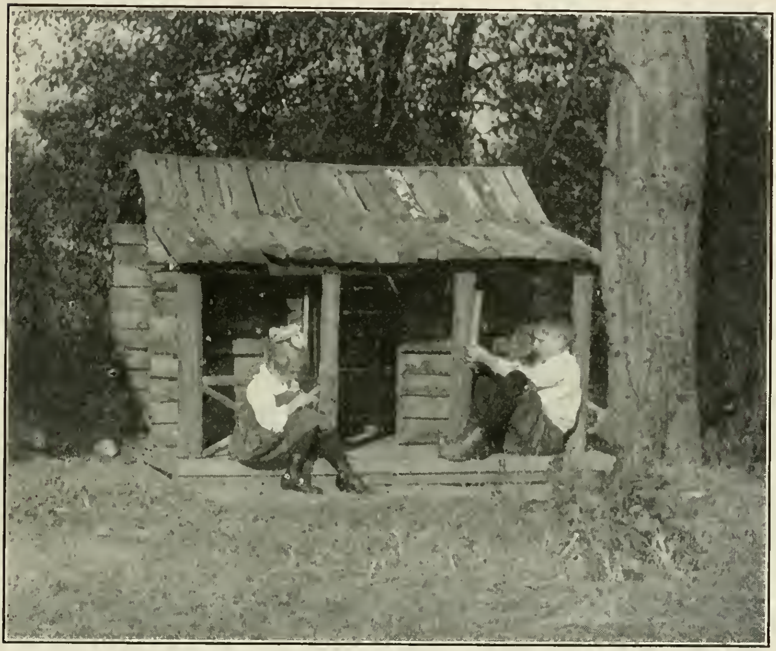

Fig. 27

Kiddie-Land Castle—Taken with sun behind the camera, thus causing a somewhat even tone throughout. Such a print lacks "snap"

—a hazy dull plate which, when developed into a negative and printed, will produce a correspondingly hazy picture, exactly comparable to the way the view appears to the eye when you look directly towards the sun at it without shading the eye.

Later on we shall see how very beautiful pictures can be made of certain views even with the sun in front of the camera, but for the present, while we are learning, and particularly anxious to start right, let's select the ideal position and have the sun so fall that if we are snapping a dark colored building, it will shine on one side and the front. Such a position will throw shadows from projections, cornices, etc., and give snap and contrast to the entire picture. If it is a light colored building, snapping from the shadow side with

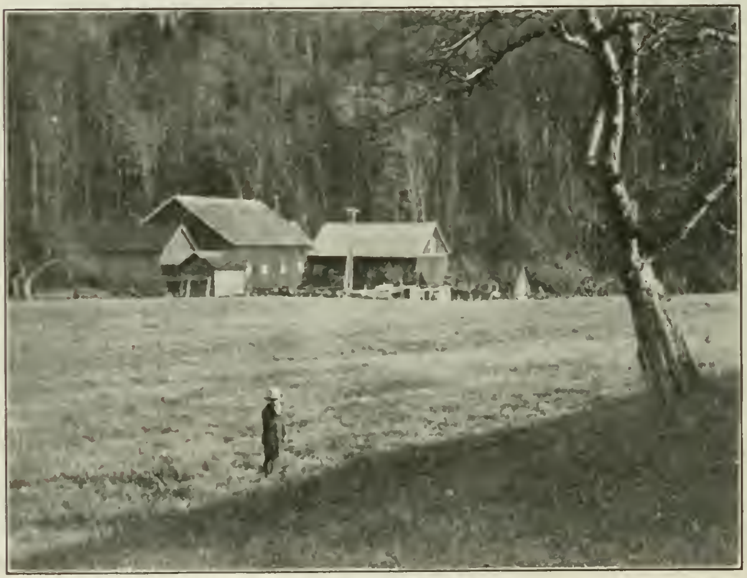

Fig. 28

Taken with the sun directly at one side. Note the pleasing high-lights the front only lighted will be satisfactory, for the entire building being light in color, the shadows will be sufficiently illuminated.

Let's get back to our landscape now. The accompanying pictures illustrate the various results discussed.

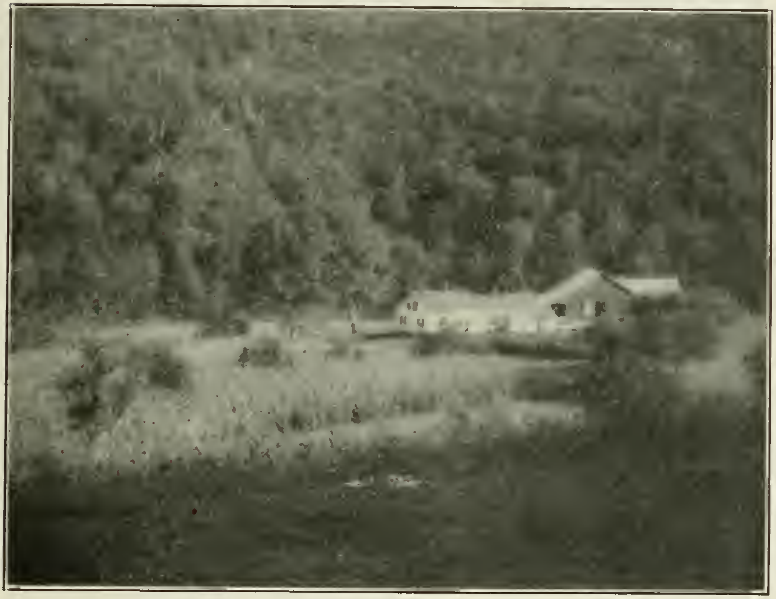

Fig. 29
The Home in the Valley—Soft focus effect with the sun at one side, and well down near the horizon

The time of day is a big consideration when proper lighting is to be considered, the most unfavorable time being when the sun is directly overhead. In the summer, from two hours after sunrise to 10:30 A. M. and from 1:30 P. M. to an hour or so before sunset is the most favorable time for good lighting effects—long shadows make much more delightful pictures than squatty shadows such as you find at the noon hour.

In choosing your landscape, don't try to include too much within the confines of the picture.

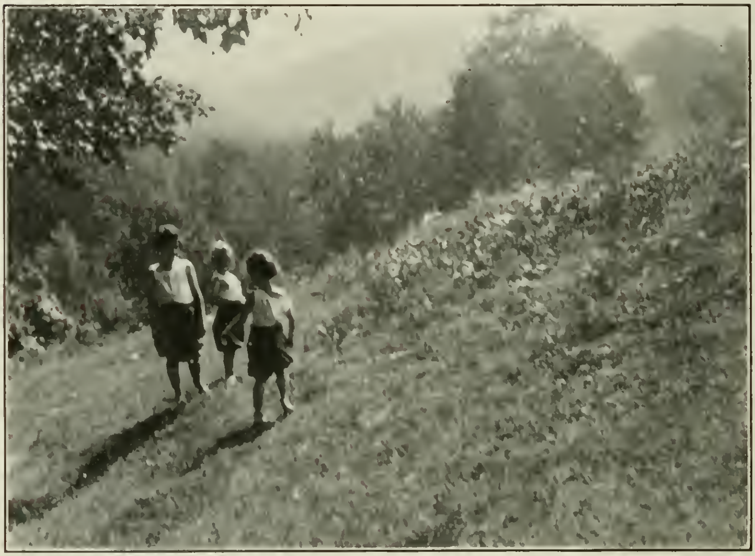

Fig. 30

Mountain Fairies—The sun was practically in front of the camera. The lens was shaded by a hat. Such pictures possess a wealth of lights, shadows, and atmosphere.

After properly adjusting your pointer on the scale according to the distance, if you are using a hand camera that is not of the fixed focus type, or after securing a sharp focus on your ground glass, if using the view camera type, stop the lens down to about U.S. 4 or F-7.7 or 8. Then determine your exposure.

In determining your exposure, if you have an exposure guide or meter, use it! If you haven't such an adjunct the following data will help you.

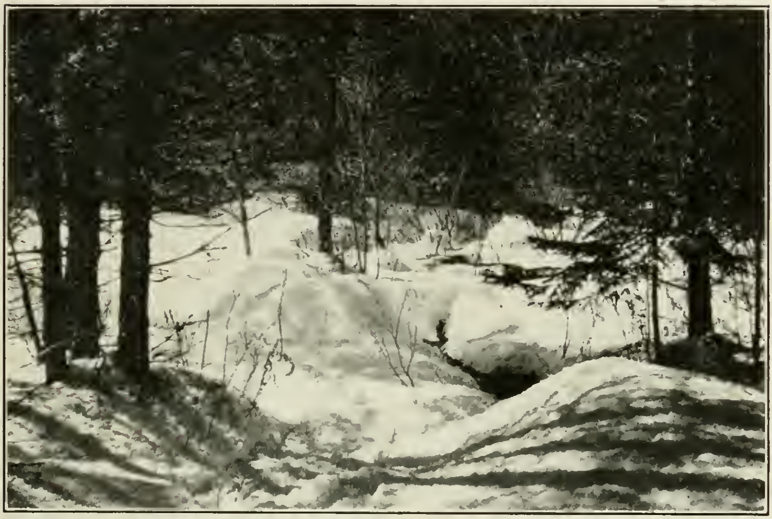

Fig. 31

The Maine Woods—Here is an illustration of the advantage of long shadows in lending interest and beauty to the foreground. Taken by *W. R. French*

Exposure table for pictures in the sun, for cameras that have rectilinear or anastigmat lenses.

	Shutter Speed	R. R. Lens Stop	Anast. Lens Stop
Group 1—Snow, Marine and beach scenes. Extremely distant landscapes	1/25	32	F-22

	Shutter Speed	R. R. Lens Stop	Anast. Lens Stop
Group 2—Ordinary landscapes showing sky with a principal object in foreground	1/25	16	16
Group 3—Nearby landscapes showing little or no sky—groups, streets scenes	1/25	8	11

Exposure table for picture in sun for the folding Kodak, Brownie, etc., that have single lenses.

	Shutter Speed	Stop U.S.
Group 1—As above	1/25	3
Group 2—As above	1/25	2
Group 3—As above	1/25	1

Exposure table for pictures in the sun for fixed focus box cameras that have single lenses.

Group 1—As above......Snapshot with second stop
Group 2—As above......Snapshot with largest stop
Group 3—As above......Snapshot with largest stop.

The accompanying cuts illustrate the three groups discussed.

After you have determined your exposure, adjust the stop and shutter speed accordingly—Never Forget to close the shutter before inserting the plate holder if using a view camera. After all adjustments are made, if using the hand camera, press it firmly against your body, hold your breath for an instant and "press the button"; then roll the next film into place, and make appropriate records.

If using a view camera, insert the plate holder in the side of the camera just in front of the ground glass. Be sure that the projection or groove near the end of the holder fits snugly into the groove or projection on the back of the camera. It should fit perfectly flush, so that no light can enter between plate holder and camera to fog the plate.

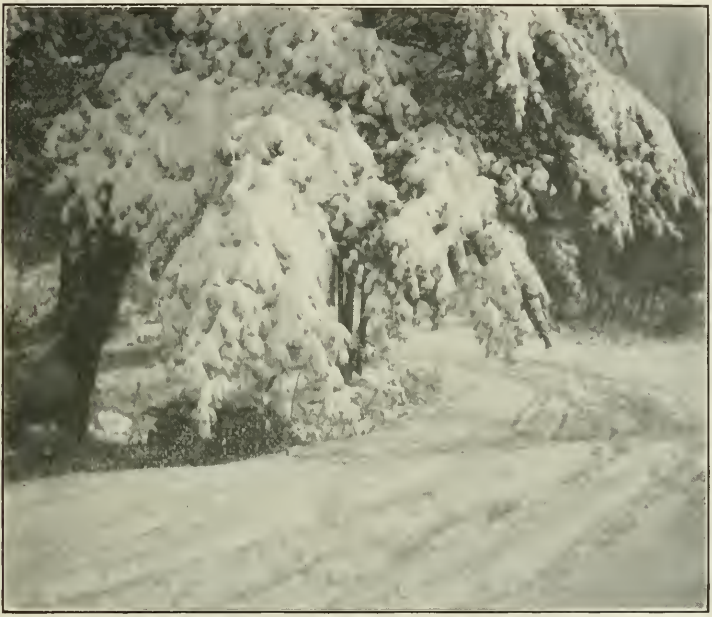

Fig. 32

Garbed in Winter's Blanket—Illustrating Group 1 of Pictures in the Sun. Taken by *W. R. French*

Now withdraw the slide nearest the lens and press the release or bulb once, thus making the exposure. Next, replace the slide in the holder, shoving it in quickly, being careful not to insert one corner first, and being sure that the black side of the handle is facing outward or towards the lens. This signifies that the plate in this side of the holder has been exposed.

From personal experience, I know of no more frequent blunder when using plate holders than that of failing to close the shutter after focusing or of failing to insert the slide, dark side of the handle out; and when using film cameras, of failing to wind the next film into place, immediately after making an exposure and before closing the camera.

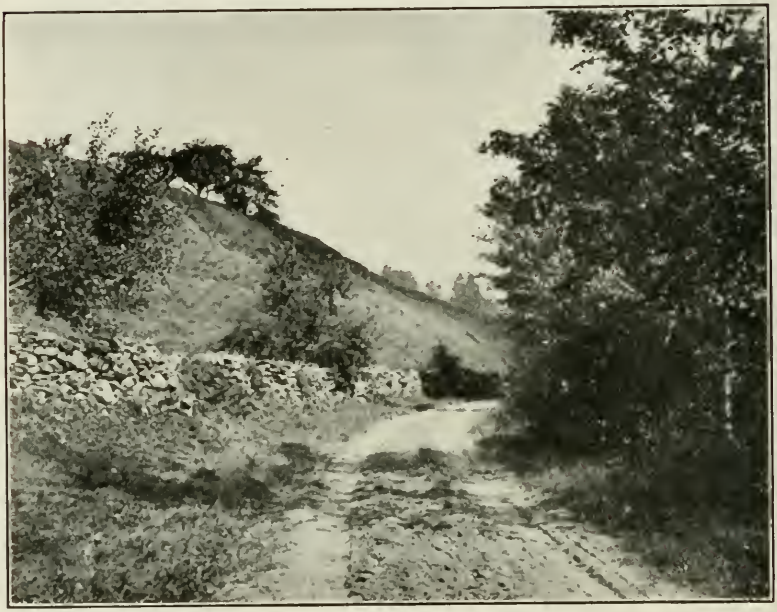

Fig. 33

The Road Through the Valley—Illustrating Group II of Pictures in the Sun

2. Pictures in the Shade

I earnestly recommend that unless you have had quite a bit of success in securing good pictures in the sun, you postpone attempting pictures in the shade, until you are more familiar with your camera. Having had considerable experience in developing amateur films, I can truthfully say that I have not seen an average of one good exposure in a dozen of those taken under any but favorable sunny conditions.

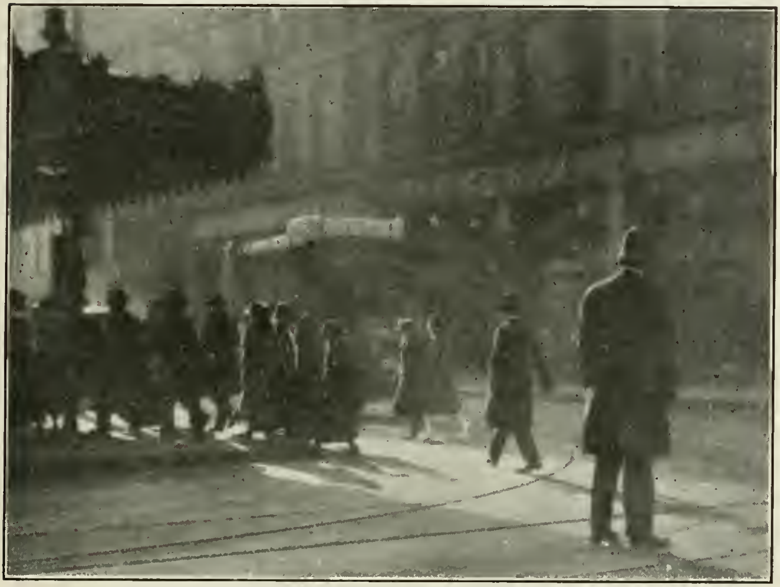

Fig. 34

The Busy Corner—Illustrating Group III of Pictures in the Sun. This is rather an extreme because of the position of the sun

If you are a careful, systematic worker, you won't be long in reaching the stage of skill when you can tackle this next stage with some degree of success.

Again I repeat, study your lighting carefully and consult your exposure meter or guide.

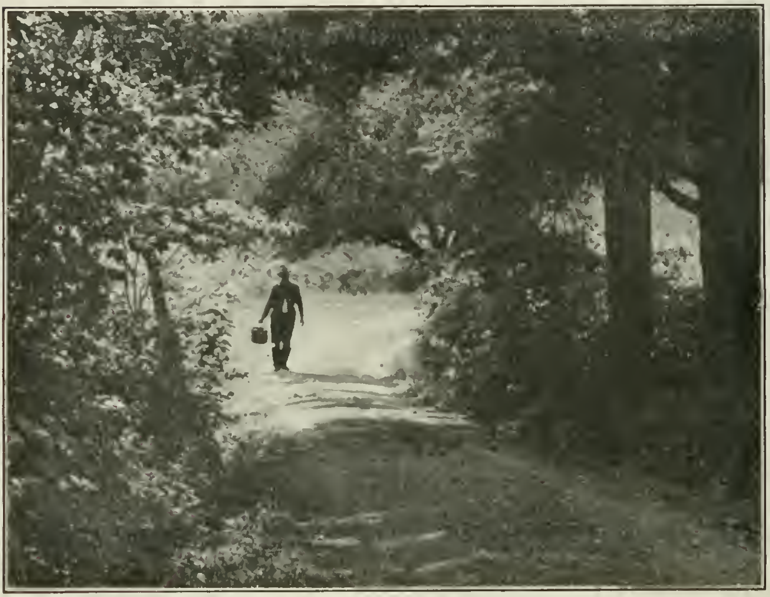

Fig. 35

Sunlight and Shadow—Also illustrating Group III of Pictures in the Sun. A picture with such heavy shadows as this is classed with street scenes

The following table will help you if you have no such device. It is correct for sunny days only. When the day is cloudy bright, the exposures should be from two to three times as long, and when the day is dull, the exposure should be from three to four times as long.

In order to give an increased exposure, say three times as long, it is simply necessary to multiply the exposure number, as given, by the factor representing the increase, for instance, an exposure three times as long as 1/25 is 3/25, or ⅛. Inasmuch as no shutter is regulated to give ⅛ of a second exposure, 1/10 can be used instead.

A familiarity with comparative stop values and shutter speeds is essential. Suppose your shutter has only these markings, T, B, 1/100, 1/25, 1/5, and 1 second; it is evident that in order to make an exposure three times as long as 1/25 you must either work the shutter three times at 1/25 or you must so regulate the stop that you can use a speed that is given on the shutter, and still obtain the same results. This is easily done by reducing the size of the stop to such an extent that, say, 1/5 of a second can be given. An understanding of stops will enable you to make such calculations easily. Beginning with stop U.S. 1, each consecutive stop, U.S. 4, U.S. 8, U.S. 16, and so on, is just one-half as large as its predecessor, therefore double the exposure will be needed, and vice versa. For instance a U.S. 8 stop will require an exposure two times as long as U.S. 4, and four times as long as U.S. 1; one-half as long as U.S. 16, and one-quarter as long as U.S. 32. The same comparison is true of the F system; F-7.7 or F-8 requires twice the exposure of F-6.3, and half the exposure of F-11; four times the exposure of F-4.5 and quarter the exposure of F-16. Now to determine what stop to use so that 1/5 second can be used, and the plate receive an exposure equivalent to 3/25 at, say, stops U.S. 8 (F-11), proceed as follows: Reduce 3/25 to 1/5 by doubling it, thus giving 6/25, which is not exactly 1/5 but near enough, and change the stop to U.S. 16 (F-16). Now you will secure an exposure equal to three times the original exposure of 1/25 at U.S. 8(F-11). The result will be even better than three snaps of 1/25 each at U.S. 8 because by stopping down you will secure more depth of focus.

To get back to the Table of Exposures for Pictures in the Shade:

For 2½ hours after sunrise until 2½ hours before sunset when the sun is shining.

	Shutter Speed	R. R. Lenses Stop	Anas. Lenses Stop
Portraits etc., in open shade, not under trees or roof of a porch —shaded nearby scenes.....	1/25	4	8
or	1/5	16	16
Portraits under trees or under a porch roof	1/5	8	11

With fixed focus cameras of the box type, and with folding cameras that do not have the stop markings shown in the table, the shutter should be set for a time exposure and an exposure of ½-second to one second given. It takes ½-second to mentally pronounce "one hundred and one."

The accompanying cuts illustrate the classes of scenes described.

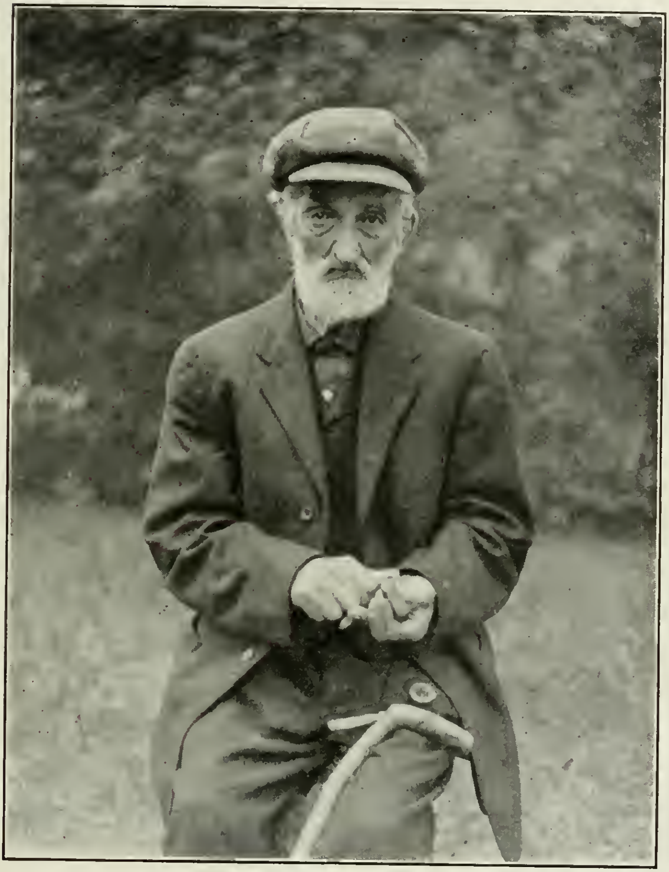

Fig. 36

Character Study—Illustrating Group I of Pictures in the Shade.
Taken in distinctly open shade. 1/25 sec. at F-8

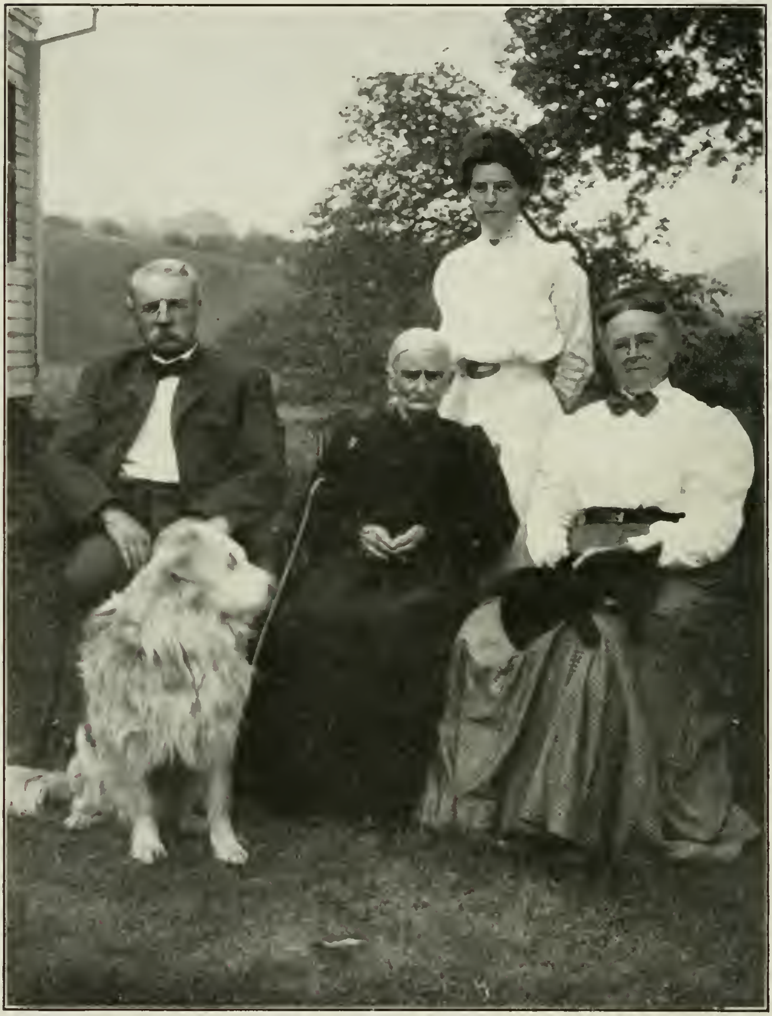

Fig. 37

Group in very open shade made by house. 1/5 sec. at F-16

We will devote the last few paragraphs of this chapter to a special discourse on exposures with the Graflex.

Using a Graflex For Ordinary Work

"In an article entitled 'Speed Cars and Speed Cameras' we find a paragraph which reads: 'But ordinary exposures are just as easy to make (with a Graflex) as extraordinary ones—by simply using the same shutter speed and the same lens stop that are used for doing ordinary work with other cameras.'

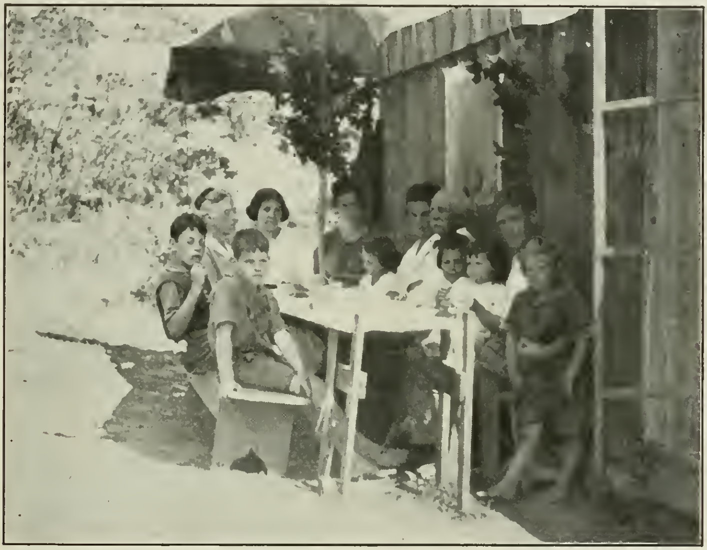

Fig. 38

Illustrating Group II of Pictures in the Shade—This is an extremely difficult type of picture to photograph correctly and requires careful developing after a full exposure.

The term 'ordinary exposures' refers to such exposures as can be made with compact hand cameras that

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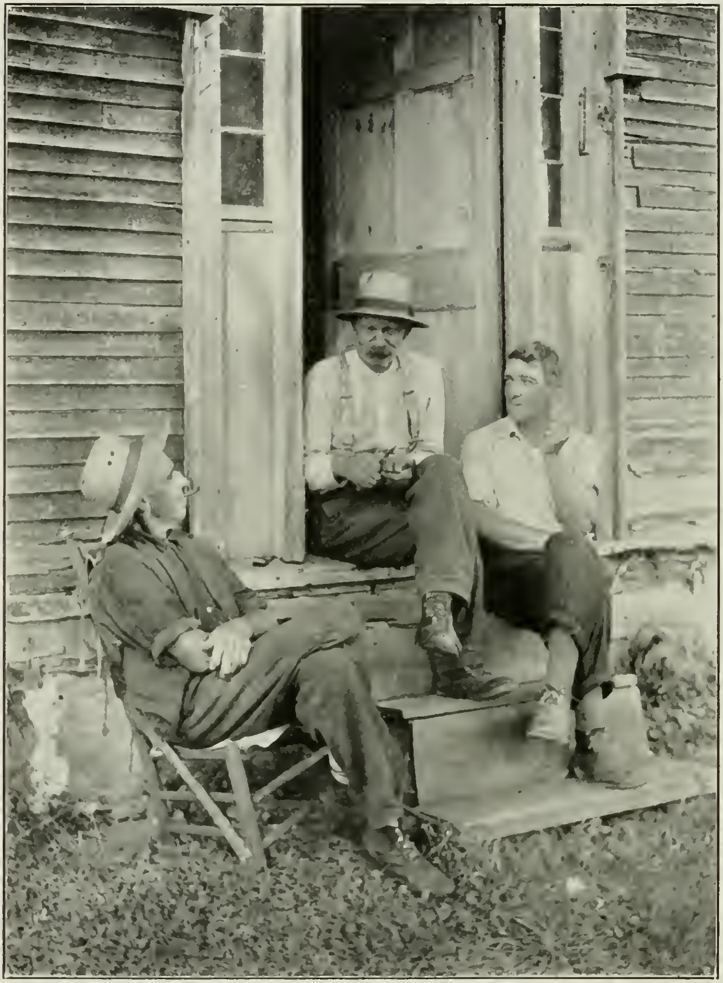

Fig. 39

After Dinner Yarns—Illustrating Group II of Pictures in the Shade, this being of the "Under the Porch" type.

are not equipped with focal plane shutters, and the term 'ordinary photographic work,' as used in the article, means photographing landscapes and practically all other stationary or slowly moving objects that the amateur pictures with hand cameras.

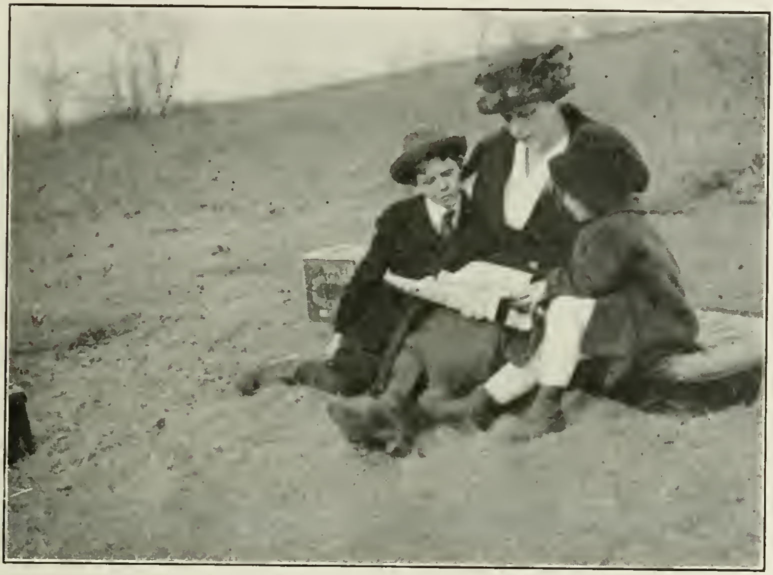

Fig. 40
Picnic Stories—Illustrating "Under Trees" of Pictures in the Shade. This was taken when the sun was casting no shadows, it being veiled

The extraordinary work for which the Graflex is pre-eminently adapted is photographing rapidly moving objects at short range. For this work a lens aperture of F-4.5 and a shutter speed ranging anywhere from 1/500 to 1/1000 of a second are needed.

For the odinary work that is done with hand cameras stop 8 (F-11) or stop 16 (F-16) and a shutter speed of about 1/50 or 1/25 of a second are most often used.

The size of the stop affects the depth of focus, that is, the sharpness of the images of objects that are at different distances from the camera. The smaller the stop the greater becomes the depth of focus and vice versa.

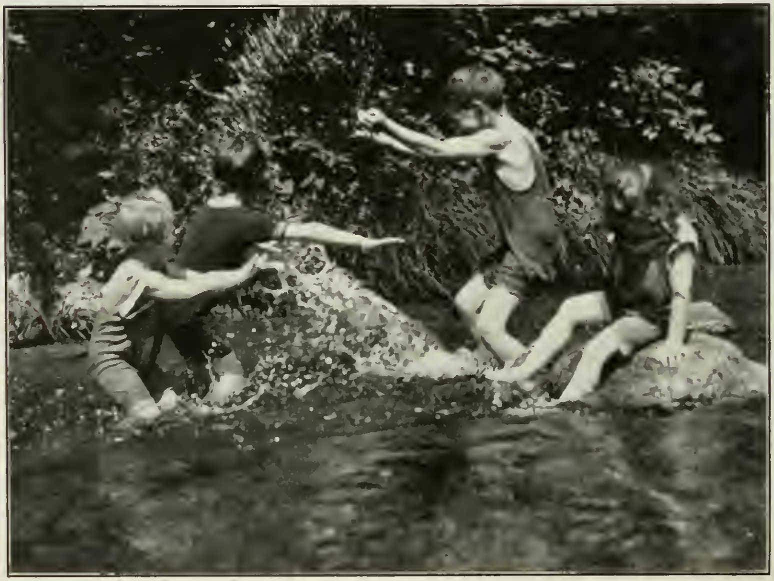

Fig. 41

Some Splash—With the speed camera, depth of focus is sacrificed, because of the necessity for using a large stop. This was given 1/250 at F4.5

The fact that speed work is done with stops which give little depth of focus and ordinary work is done with stops which give considerable depth of focus, suggests that these two classes of work are judged by different standards. Whether the photographer is conscious of the fact or not, is made evident by letters we sometimes receive from speed workers, asking why the methods that give them what they want in speed photography do not give them what they want in ordinary landscape photography.

In speed work the photographer wants to get sharp images of rapidly moving nearby objects which are, in most cases, the only things of interest in the pictures. This can only be done by using a large stop on a fast lens and a very fast shutter speed.

In ordinary work, such as landscape photography, where several objects of varying degrees of interest are included in the picture, the photographer wants to get sharp images of objects, that are partly in sunshine and partly in shadow, at various distances from the camera, and this can only be done by using a medium or small lens stop.

The smaller the stop the slower the shutter speed that must be used for insuring ample exposure.

From 2½ hours after sunrise until 2½ hours before sunset, on a sunny day, the standard exposure for any ordinary landscape that has a prominent object in the foreground is 1/25 of a second with stop U.S. 16 (F-16). For an extremely distant landscape it is 1/25 of a second with stop U.S. 32 (F-22). For a nearby landscape it is 1/25 of a second with stop U.S. 8 (F-11) and for a portrait in open shade, with nothing but the sky overhead, the exposure is 1/25 of a second with stop U.S. 4 (F-8).

These exposures are neither the shortest nor the longest that will give good results. They are averages which insure ample exposure."

Getting Sharp Pictures

If we take a photograph with a Kodak, and find that it is not sharp after being developed, one of three different things was wrong:

(1) We failed to hold the camera still, or

(2) The subject of the photograph was moving too quickly, or

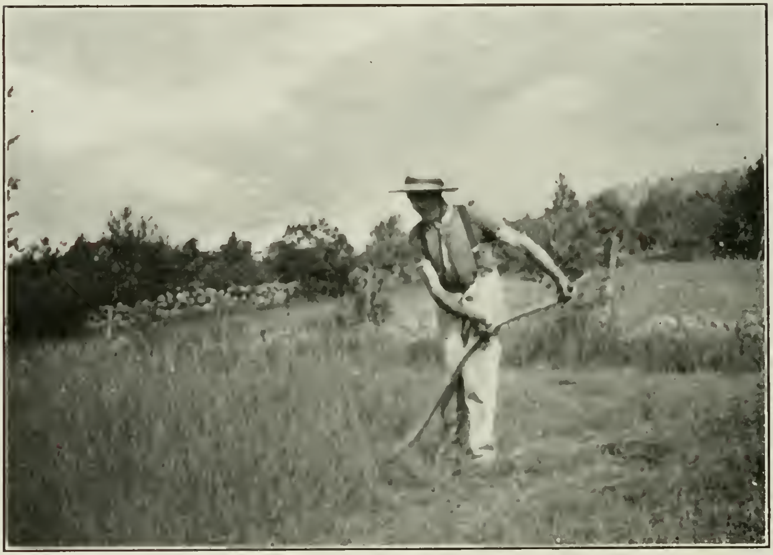

Fig. 42

The Mower—Also a type of speed picture but not classified as such. Such pictures can be taken with an exposure of 1/150 at F8, in the sun

(3) The camera was not focused correctly.

Most people fail to pay sufficient attention to holding the camera still. Just at the moment of exposure the attention should be concentrated on this point. The camera should be held firmly and great care should be taken not to jerk the camera in releasing the shutter. A little practice in this, without a film in the camera, is advisable. It will probably be found at first that in releasing the shutter there is a tendency to give a jerk to the camera as a whole, but with a little practice the camera can be supported partly by the fingers of the hand that is used to release the shutter so that no jerk results. So many pictures are spoiled by not holding the camera still that attention to this point will be well repaid. It is not possible to hold a camera still at arm's length, nor immediately after running or walking fast. If any exposure longer than 1/25 of a second is to be given, the camera must be placed on a tripod or on some other firm support. Many people who always jerk the camera when pressing down the shutter trigger can avoid all difficulty by the use of the cable-release.

Not many pictures are spoiled by the movement of the subject so long as the camera is not used for photographing rapidly-moving objects. Figures in the distance will be sharp with an exposure of 1/25 second, but for children playing near at hand, in bright sunlight, the shutter should be set at 1/100 second; while for cyclists, autos, and any racing or sports, such as tennis, golf or baseball, no speed below the highest of the Optimo or Compound shutters will be effective unless the subjects are, say, 100 feet from the camera. For such special subjects a Graflex with a focal plane shutter is far more suitable than any other camera. It is a great mistake to attempt subjects beyond the scope of the camera being used. A Brownie, which will make excellent pictures of landscapes and groups, will fail to get anything but a blur if it is used to photograph a locomotive rushing past.

A frequent cause of unsharp pictures however, is inaccurate focusing. Fixed focus cameras, such as the box Brownies, are focused on the nearest point to the camera which will still enable the extreme distance to appear sharp in the picture. In this way objects in the middle distance are perfectly sharp and even near objects are sharp, provided that they are not too near.

The following table of the nearest object which is sharp with these fixed focus cameras may be useful:

Vest Pocket Kodak..........	9	ft.
No. 0 Brownie..............	9	ft.
No. 1 Brownie..............	11	ft.
No. 2 Brownie..............	13½	ft.
No. 2-A and No. 3 Brownie...	15	ft.

If we are using a No. 1 Brownie, for instance, as long as everything is farther off than 11 feet we can rely on getting a picture with everything focused sharply.

With the focusing Kodaks we must judge the distance of the objects on which we wish the focus to be sharpest and set the scale to that, then we shall find that objects somewhat nearer and also objects a good deal farther from the camera are also sharp, and the smaller the stop used the deeper the zone of sharpness is.

It may be asked: Why not always use a small stop and avoid all difficulty about focusing? The reason is that a small stop lets through less light and by using it we run the risk of under-exposure when making snap-shots. More Kodak pictures are spoiled by under-exposure than by anything else so that we must be careful about this risk.

Another reason is that we do not always, or indeed often, want everything in the picture sharp. In a portrait, for instance, the figure itself should be sharp, but the background and surroundings will be much better out of focus so that interest is centered on the portrait alone. But when as much as possible of the scene is required to be sharp the best procedure is to be very careful to focus the camera on the principal object and then give a time exposure with the smallest stop.

The stops that give the most generally pleasing degrees of sharpness when hand cameras are used are:

U.S. 16 (F-16) for landscapes.
U.S. 8 (F-11) for groups.
U.S. 4 (F-8) for portraits.

The rule is to use no stop smaller than 16 for snap-shots (1/25 second exposures) across a landscape. If this rule is ignored the negative will usually be under-exposed.

CHAPTER V

THE PROCESS OF DEVELOPMENT

AFTER a plate or film has been exposed, one might expect that its appearance has been changed in some way. The question is quite frequently asked by those not familiar with the game after their picture has been taken: "May I look in and see what I looked like?"

An exposed plate, however, looks just exactly as it did before the exposure. The picture is there and one needs the wonderful chemical action of the developer to bring it out in all its delicate details of light and shade.

Have you seen the wonderful "Magic Pictures" that are displayed in some children's book stores? Pictures in black and white which, when brushed over with water, suddenly assume gorgeous hues? This transformation is but another illustration of the marvellous things that can be done with chemicals.

Just now, in order to simplify your work for you and help you to get down to "brass tacks" I shall postpone elaborating on the "why" of development and talk about the "how." At the end of the chapter look for the "why" if you want it.

You will need the following material for developing your plates or films. Get it all in readiness before you enter your dark room, for, if anything is a nuisance in photography, it is that of starting a manipulation only to find that something is lacking at a very important period of the process.

Material For the Developing Process

1. Dark room lamp with plenty of oil, or a red electric bulb.
2. Developing dish, 4 x 5.
3. Rinsing dish, 4 x 5.
4. Fixing bath dish, 4 x 5. If you have a number of plates to develop, a dish large enough to hold two or more plates will greatly facilitate matters—say your 8 x 10 dish.
5. Plates, or films to be developed.
6. One or more tubes of developer.
7. Package of acid hypo.
8. Graduate and stirring rod.
9. Thermometer.
10. Film clips if using films, two for holding the film while developing it, and one for each film when hanging it up to dry.
11. Tuft of absorbent cotton, size of egg.
12. Funnel.
13. Oil cloth.
14. Bottles—the 8 oz. and the 32 oz.
15. Washing tank, or other receptacle.
16. Towel.
17. 10 per cent. solution of potassium bromide.

Now you are ready to proceed.

Arrange the oil cloth on the developing stand so that any spattered developer cannot come in contact with your wife's or mother's household linen, or what-not, for developer is a bad stainer. Of course, if you are fortunate enough to have a special room to yourself where you can slop around to your heart's content you are to be congratulated—not one beginner in 500 is so blessed. But at that, it would be well to use the oil cloth, or newspapers, for you should aim to keep the developing stand or shelf clean.

The Developer

Mix your developer exactly "according to Hoyle," i. e., instructions on the tube. If you have plenty of time at your disposal and have plenty of patience, making the solution of half strength by using double the amount of water is a good plan, for your negatives will be softer (not so contrasty) as a result.

Be particularly careful of the temperature of your developing solution. It should not be colder than 65° Fahrenheit, nor warmer than 70°—the nearer 65° the better. A cold solution causes slow development and weak, flat negatives. A warm developer is apt to cause fog, contrasty negatives, and may even soften the emulsion on the plate or film to such an extent that it will scratch if you look at it hard and it may lead to "reticulation."

In warm weather, unless you are very careful, you will meet all kinds of difficulties in this respect, but if you can secure ice conveniently, by having a dipper of ice water at hand when mixing your solution, you can avoid the difficulties mentioned. In cold weather your trays should be warmed through at the start, before pouring in the solutions.

After mixing your developer pour it into the bottle leaving it there until the fixing bath is ready.

The Fixing Bath

As the chemicals, Hypo (Hyposulphite of Sodium), Alum, Sulphite of Soda, and Acetic Acid, which constitute this preparation are somewhat slower in dissolving than the developing agent, it is well to prepare the fixing bath first. It will dissolve much faster if you will first pour the required amount of water into the large bottle, followed by the dry chemicals, one at a time, which can easily be poured in by using a paper funnel. As the addition of Hypo to water lowers the temperature to a marked extent, it is well in cold weather to use water which has been slightly warmed. The bath works better if kept around a temperature of 50 to 60° Fahrenheit.

By shaking the bottle, the chemicals will dissolve more rapidly. Be sure to follow instructions on the package!

Many photographers choose to use a plain Hypo solution rather than the acid-alum combination. Such a practice is all right in cold weather, but is very risky in warm. Acid Hypo acts as a hardener of the film, thus its usefulness in hot weather.

Plain Hypo can be bought both in powder and crystal form. In making the solution it is dissolved in the ratio of one part of Hypo to 4 parts of water—1 oz. to 4 oz., 2 oz. to 8 oz., and so on. It can be measured in the graduate with sufficient accuracy when no weighing scales are to be had, but the graduate should be very thoroughly washed out after using it.

As a substitute for a graduate in an emergency, you can use an ordinary tumbler, as it holds approximately eight ounces. A slight variation in the strength of the bath makes no difference, provided that you fix for five minutes after the milky appearance has disappeared from the back of the negatives.

Keep in mind one very important caution, that is—NEVER allow Hypo to get into the developer, nor into any dish in which developer is to be mixed, without thoroughly washing it before using it for developer. To avoid using the Hypo tray for developing, you should print "HYPO" on the bottom of the Hypo tray. A simple but effective stunt is to stick a "Hypo" label on the side of one tray and cover it with a layer of melted paraffin.

Now that your solutions are ready, arrange your dishes so that a tray is in front of the lamp with the other dishes at the right, the rinsing dish being in the middle.

If you have a sink in your dark-room it should be still further to the right, if not, your washing tank or other dish of water should be in its place. Of course, the position of table, sink, etc., as given, is not of such vital importance that other arrangements would not do just as well. I am giving a very common and popular arrangement.

Place your plate holders or film at the left of the developer, clips beside the tray; light your ruby lamp; "douse the glim" (put out the light) and go to it. Pour out your solutions, being careful that no Hypo spatters.

Developing the Plate

Remove the plate from the holder, keeping hold of it by the edges (finger prints on the emulsion are bad marks), immerse it in the clear water (this is to prevent air bubbles from forming on it in the developer. If they do form, there will be circular, undeveloped spots on the negative). Transfer it to the developing tray shiny side (glass side down) as follows: Slightly tip the tray so that the right end is off the table; place the plate in and quickly lower the tray so that the liquid will flow quickly over the whole surface in the same instant. This is to prevent uneven development.

Another method is to pour the developer from the graduate directly on to the plate, after wetting it as before, taking care to cover it quickly with the developer.

Now rock the tray gently to keep the developer in motion so that any undissolved chemicals which may be in it will not settle and remain on one portion of the plate.

After a few seconds, maybe 15 to 20, the picture will begin to appear, first the sky and all other portions which were white or strongly lighted in the view itself, and finally, after several minutes, all the details in the picture will show distinctly, if it was correctly exposed.

If the whole surface turns dark quickly at the start, the plate was over-exposed. If portions turn quite black while others show nothing but masses of white, it was under-exposed.

The trick of developing is to be able to estimate by inspection of the forming negative just when to transfer it to the fixer. Such a degree of skill requires a lot of experience, but the general rule is to leave it in the developer until the back of the plate is quite dark, and until the negative, when held before the light, appears as strong from the back as from the front side. You can watch this change by occasionally lifting it out of the developer.

Another method is to hold it so that you can look through it at the light and when it becomes so dark that you can hardly see through the high lights, it is developed.

Be careful not to hold it close to and in front of the lamp too much or you may fog it, even though the ruby light is apparently a safe light.

When developed, rinse it in the clear water, or under the tap and place it in the fixing bath, same side up as before.

After it has been here a half minute, you can safely turn on the light if you wish.

Fixing the Negative

While in the fixing bath the tray should be rocked slightly. The negative should be thoroughly fixed in 12 minutes, that is, the creamy color which is the emulsion containing silver bromide should have entirely disappeared. Too many beginners remove the negative too soon after this emulsion can no longer be seen on looking at the back of the negative, for even though all creaminess may have disappeared it is quite likely that

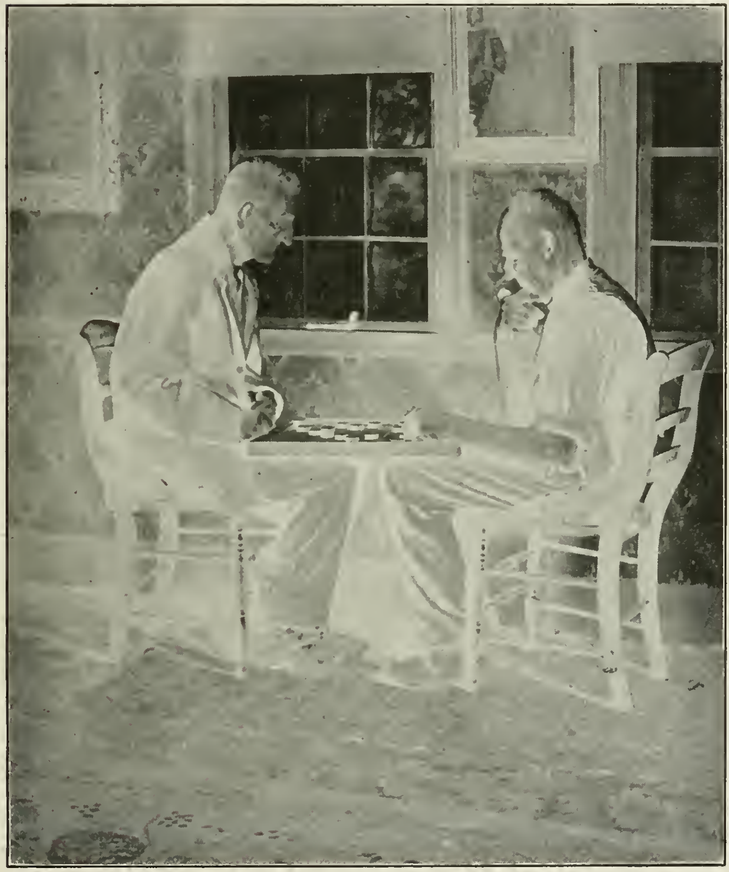

Fig. 43
Correctly Exposed and Correctly Developed Negative

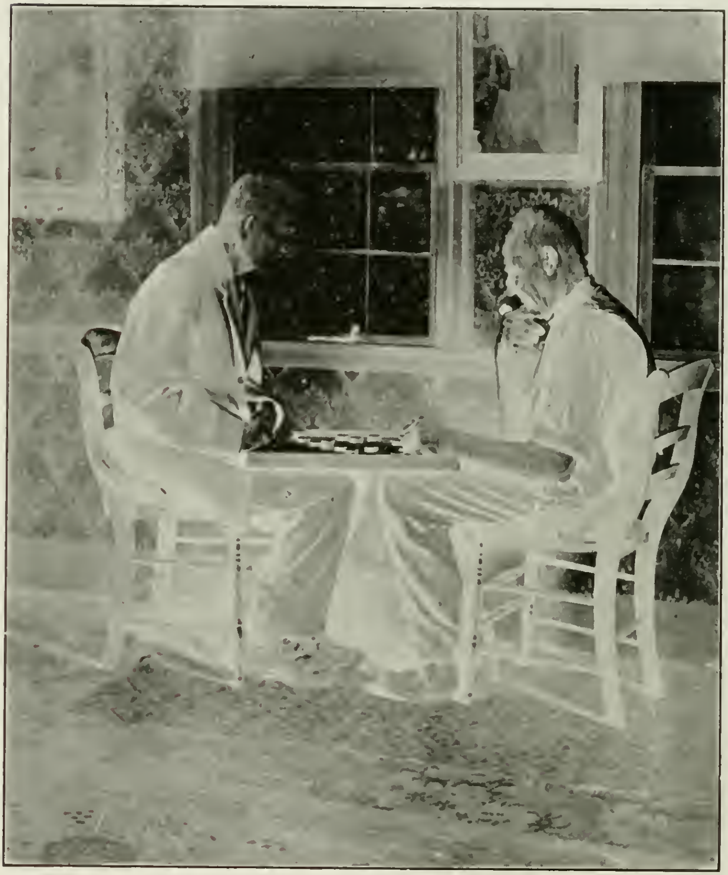

Fig. 44

Correctly Exposed, But Overdeveloped—contrasty and too strong

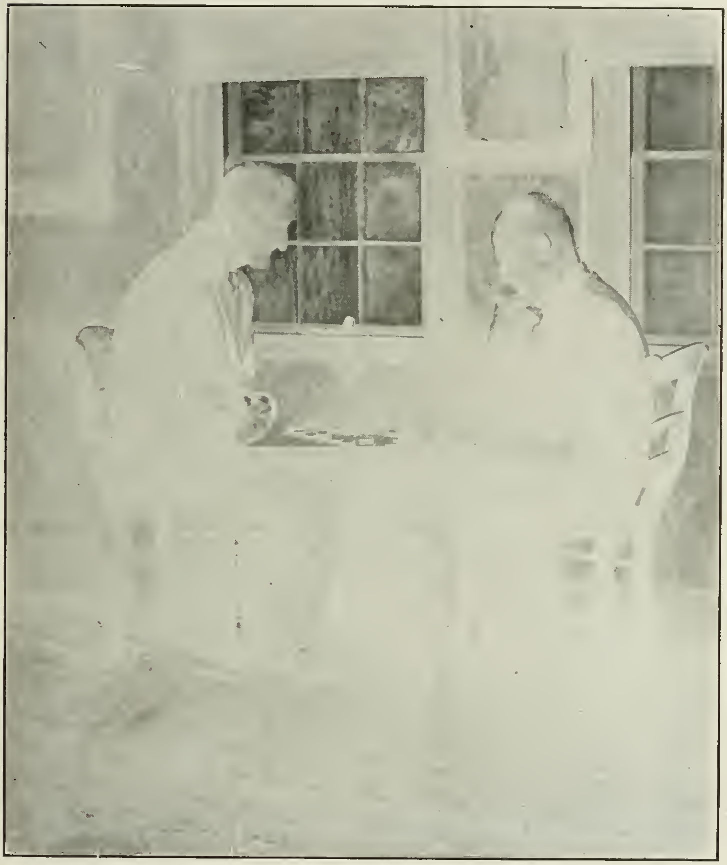

Fig. 45
Correctly Exposed But Underdeveloped—weak and thin

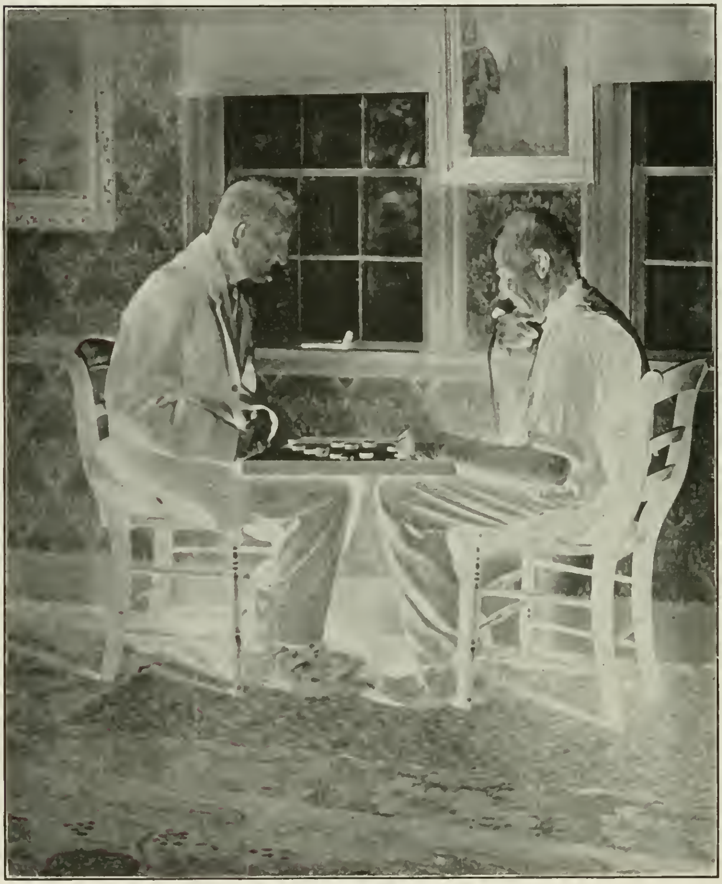

Fig. 46

Over-Exposed and Correctly Developed Negative—strong, but a good printer

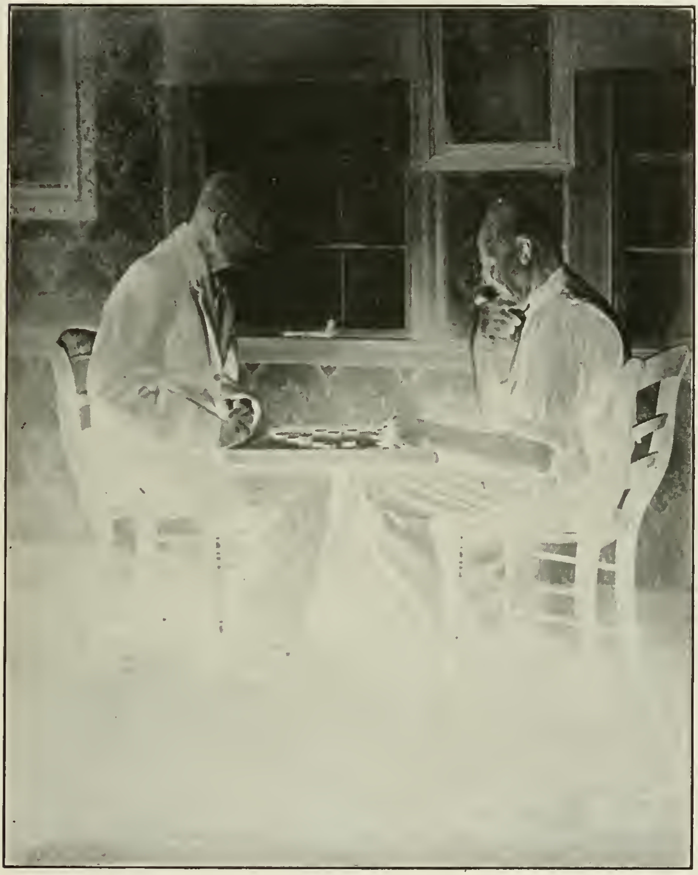

Fig. 48
Under-Exposed but Over-Developed Negative—contrasty

chemical action has not wholly ceased, and unless it has, in time the negative is sure to discolor.

There are two stages in the fixing process. In the first stage the undeveloped silver bromide is removed. This clears the negative; but during this stage an invisible salt is formed which water cannot remove. Though this salt is insoluble in water it is soluble in hypo and it is during the second stage of fixing that the hypo removes this salt from the film. The safest plan to follow is to use a freshly and correctly compounded fixing bath for every batch of plates, and to fix each negative for at least twelve minutes, being careful to leave it in the bath for at least three minutes after the milkiness has disappeared.

CAUTION—BE SURE to rinse and wipe the fingers before developing more plates.

Fingers that have a trace of hypo on them will taste salty.

Washing the Negative

Negatives should be washed from 40 to 60 minutes in running water which is constantly passing over both sides of each negative, or in six changes of water, at intervals of five minutes if washed in trays or other still-water utensils. The object of washing is to remove certain chemicals remaining in the negative.

With a washing tank, negatives can be very simply washed, for they can be placed vertically in the tank, in pairs back to back, and the water changed as often as desired. If running water is at hand, it should not be allowed to run forcefully onto the negatives. It is a good plan to tie a rag over the faucet, letting one end hang so that its lower point reaches slightly into the tank. In this way, the water will flow smoothly into the tank without splashing.

CAUTION—Never allow plates or films to soak over ten minutes in warm still water such as you get from the city faucet in July and August and even September.

One of the biggest disappointments of my life developed through my failure to observe care in this respect. I had just returned from a thirty-mile visit, and, after a most happy hour spent in developing and fixing six plates on which were six dandy likenesses, I placed them to wash, or rather to soak in a tank, while I went to the store. The evening was hot (likewise the water) and when I returned not a "blessed smich" of film was left on a single glass, it had all run off into the tank.

I should add that my fixing bath was just a plain hypo bath, otherwise the results wouldn't have been quite so bad, for with an acid bath the film would have been considerably harder as a result of the hardening effect of the alum in the solution.

Drying the Negative

When the negatives are washed sufficiently, take a wad of absorbent cotton and gently wipe over the entire surface of the negatives several times with fresh water, and place them in the drying-rack as far apart as space will permit. Place the rack in a warm place, preferably in a draft, but away from dust and moisture.

NOTE: Tanks can be purchased for fixing as well as for developing, and are great time-savers. See any catalog of photographic supplies.

CAUTIONS—

Don't place the rack in the sun.

Don't change the rack from one place to another, after the negatives are partly dried, in order to hasten drying, otherwise you may have negatives of uneven density.

Don't place the rack near a hot stove, for the gelatine may soften and run. I could cite almost innumerable instances of personal carelessness, many of which have caused extreme disappointment. Once I placed a rack of good negatives on the door-step in a good breeze. Result: A batch of negatives peppered with sand. Another time, everyone else being away, a batch was left on the floor near the stove. Result: Puss came along and made a meal off the gelatine. And still another instance: A negative from which I wanted to print in a hurry was placed on the mantle near the stove-pipe—the accompanying illustration demonstrates what happened to it. Truly, experience is a costly teacher. It is far more sensible in photographic work, to read and follow advice.

Developing Roll Films

Break the seal with which you fastened the end of the film after your last exposure, and unroll the end until the white film appears. Grasp this with the right hand, or better still attach a developing-clip to it, then completely unroll it.

The lower end will be fastened to the duplex paper. Break this fastening, and attach another clip. The use of clips not only prevents staining the fingers, but enables you to more successfully hold the film when it becomes soft.

Pass the film through the tray of water several times, holding the two ends, one in each hand. This process wets the surface and thus prevents air-bells from forming when the film is passed through the developer. Now run the film through the developer, face down,

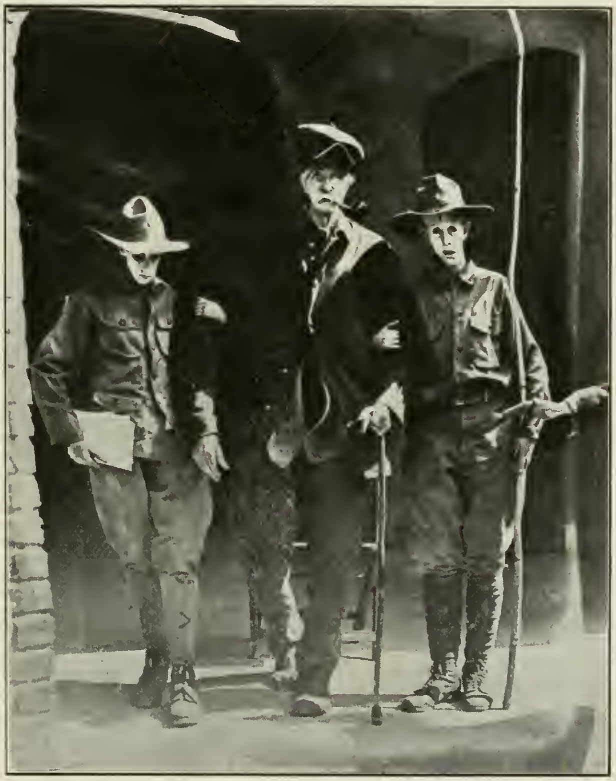

Fig. 49
Result of Softening of the Negative Film almost to the Point of Melting.

repeating the movement until the film is developed. Read again the instructions on developing the plate, for details in regard to determining when the film is developed.

There are on the market improvements over the ordinary tray for developing films. Probably the most important is the Kodak Developing Tank, an outfit which enables one to develop films in daylight, and which has a time and temperature method that insures good negatives from correct exposures. A request to the Eastman Kodak Co. for a catalog would quickly bring the desired information to you.

Another dark-room device for films which is an improvement over the ordinary tray is the Ingento Film Trough. It is fitted with a rod adjusted near the bottom of the trough, under which the film is slipped and then drawn up and down as in tray developmnet.

Unless you were fortunate to make correct exposures of every section of the film, you will perceive that the film develops unevenly. Your test as a good or poor judge of development will depend on your judgment as to when to remove the film. The best course to follow is to note which section or sections develop evenly, and to disregard those that flash up suddenly (the over-exposed) and those that develop slowly with a lot of white showing (the under-exposed) and develop until the model sections are of the right density as in plate development, they will be developed when, in looking through them at the light, they are quite dense and yet possess detail.

You must bear in mind that your chances of fogging tray-developed films are greater than with plates, because they are exposed more to the direct rays of the lamp, therefore, the more you can protect them from it the better. Besides, you must be more careful that all light from outside the dark-room is excluded. Moonlight, even, will produce fog unless it is quite fully shut out of the room.

Fixing Films

When developed, rinse them thoroughly and then fix them in the same manner as when developing. (Read the instructions on "Fixing the Negatives.")

By being careful to see that the film is entirely immersed, you can, after passing it through the bath a dozen times, place one end of it in the tray, still face down, and lower the strip into the solution in folds (clips should be removed). Gently press the film where the folds occur, not tightly enough to crack it, down into the solution a few times during the period of fixing. Be sure to leave it in the bath a few minutes after all milkiness has disappeared.

If preferred, negatives can be cut apart and fixed separately. When cutting apart exposures made on Autographic Film after development, always leave the writing next to the foreground of the adjoining negative in the case of vertical pictures, or at the left hand of the negative when looked at from the reverse side, right side up, in the case of horizontal pictures.

Washing Films

Read instructions on "washing negatives." The procedure is the same as regards time and change of water. The film may be allowed to roll up in the wash bowl when soaking, but occasionally should be unrolled by grasping one end and pulling it up until the film is straightened out, then allow it to roll up again.

If water is running into the bowl continuously, there is no need of unrolling it more than two or three times. Do not crowd too many films into too small a tray during the process.

A simple arrangement for washing films where running water is available is to construct a wooden box several times as wide as your widest films; as long as the most common film which you use; and about one foot deep. Make it fairly water-tight at the ends. Five inches from the bottom, fasten cleats one inch square across on the inside. Similarly fasten two more, but five inches above the lower two. With pins, your films can be fastened by the ends to these cleats and side by side. They should be face down. Now by setting the box under the faucet with a piece of hose just long enough to reach from the faucet to the bottom of the box, you will have a very effective washing arrangement.

The water should not be allowed to run with force—simply enough to keep up a circulation.

Another very effective arrangement which I have used is as follows: Prepare a piece of pine board a little longer and a trifle wider than your strip of film. Pin the strip, back down, upon the board; run cold water into a bathtub to the depth of six inches, and then float the board in the tub, film down. The hypo being heavier than water will go to the bottom of the tub, and in thirty minutes the washing will be complete.

Drying Films

When thoroughly washed, snap a Film Developing Clip on each end of the strip and hang it up to dry, or pin it to the edge of a shelf. Be sure that it swings clear of the wall.

It would be well, before hanging it up, to attach one end to a small hook over the sink, and swab it off with a wad of absorbent cotton so that all foreign particles are eliminated; this includes both sides. All surplus moisture should be removed before hanging it, for if drops or streaks of water are left on them, they may cause transparent spots on the dried films. These large drops can be removed by using absorbent cotton, which has been soaked and squeezed.

If the film has been cut up, pin one corner to the edge of a shelf, or hang the negative on a stretched string by means of a bent pin, running the pin through the corner of the film to the head, then hooking it over the string.

Developing Film Pack Films

If the Film Pack Films are to be developed in a tray, several can be handled at one time provided you are careful not to scratch them.

Be sure to immerse them in water first, then place them, one at a time in the solution, face down. Constantly rock the tray throughout their stay in it, and handle them over occasionally to prevent their matting together. Follow out the same procedure in developing, fixing, and washing, and drying, as that used heretofore. Do not attempt to develop more than four at one time, and not even that many on your first attempt. In fixing and washing you can increase the number, if careful.

FILING NEGATIVES

A system for filing negatives is a great asset to any photographer's equipment, whether he is an amateur or a professional. A system is always a time-saver, consequently a money-saver to the busy man, therefore I advise you to adopt some such practice on the completion of your first dozen negatives.

Filing Film Negatives

The best way to file film negatives is to place them in a Film Negative Album. This convenient device usually contains one hundred numbered compartments, made of a special kind of translucent paper that is free from all impurities that would injure a negative.

Another system, considerably cheaper, and appropriate to use in filing glass negatives as well, is a regular card index system. Each negative is filed back of a plain white card having a raised tab on which the number of the negative is written. The same number is written on the negative edge in ink unless it is an autographic film. This same number is written under the appropriate heading of the guide card.

The guide cards are cards giving a classified list of subjects, such as Children, Roads, Lakes, Trees, Houses, etc.

An illustration that is self-explanatory:

CHILDREN
25. John feeding Fido.
33. The Perry children.
48. Alice with daisies.

ROADS
26. Along Lake Kezer.
38. To the meadow, 1920.
44. Up Foss Hill.

HOUSES
27. Our home, 1921.
28. Young's in winter.
35. Kezar Fall's woolen mill.

Filing Glass Negatives

The system just described can be used, or the negatives can be filed in the boxes in which they were bought. In the latter case a classified card index should be kept as in the system already given, but the numbers on the cards, instead of being negative numbers, should be box numbers corresponding to numbers which should be placed on the ends of the boxes. Illustration:

CHILDREN
Box 1.—John eating pie.
Box 2.—Barbara sewing.
Box 3.—Donald coasting.

Negatives should be placed face to face and back to back. The reason for placing them in this manner is to avoid having the gelatine come in contact with the finger-marks that usually exist on the glass sides of negatives.

The boxes of negatives should be placed on edge rather than on one another.

MORE ABOUT DEVELOPING

To this point I have given you the principles of developing by tray because every beginner who aspires to attain advanced skill in photographic work needs just this experience as a foundation. I shall proceed now to elaborate on other methods, and on certain scientific principles, causes and effects, and on Tank Development.

What Happens in Development

You may not be a chemist, but it is not necessary that you should be in order to understand something of the wonderful chemical action that takes place when the image produced on the plate by the lens is being changed to a visible negative; a negative is the opposite in every respect to a positive, dark tones in the positive being light tones in the negative, and the left side in the positive being the right side in the negative, and so on.

Now why must a film that has been exposed in the camera be developed in order to produce a picture? Simply this: The emulsion with which the film is coated and which is sensitive to white light, consists of a thin layer of gelatine in which are imbedded the sensitive grains of silver bromide. It is this compound that the light affects in different degrees after passing through the lens. The developer is so formulated that it attacks the silver bromide of the emulsion and turns it into black metallic silver by attracting the bromine away from the silver.

The grains of metallic silver which are left in the film appear black because they are small and irregular in shape. We think of silver as bright, but when it is broken up into small particles it appears gray and the grains of silver in the film are so spongy that they appear quite black.

The grains of silver bromide in the film, which were not exposed to the light that passed through the lens, or at least very little as compared with the grains affected by the rays reflected from highly lighted objects, such as the sky, sunlight on white objects, etc., are not affected by the developer, and therefore appear transparent. Examples of this appear in pictures containing dense black shadows.

In the two illustrations following, Figure 50 is that of a negative possessing a wide range of tones from black to very light.

The different degrees of density are due to the different degrees of light intensity affecting the emulsion.

Figure 51 is that of a negative developed in an unsafe light. It was subjected to so much stray light that the silver bromide throughout the entire plate was affected and consequently changed more or less to metallic silver by the developer. Such a negative is "fogged."

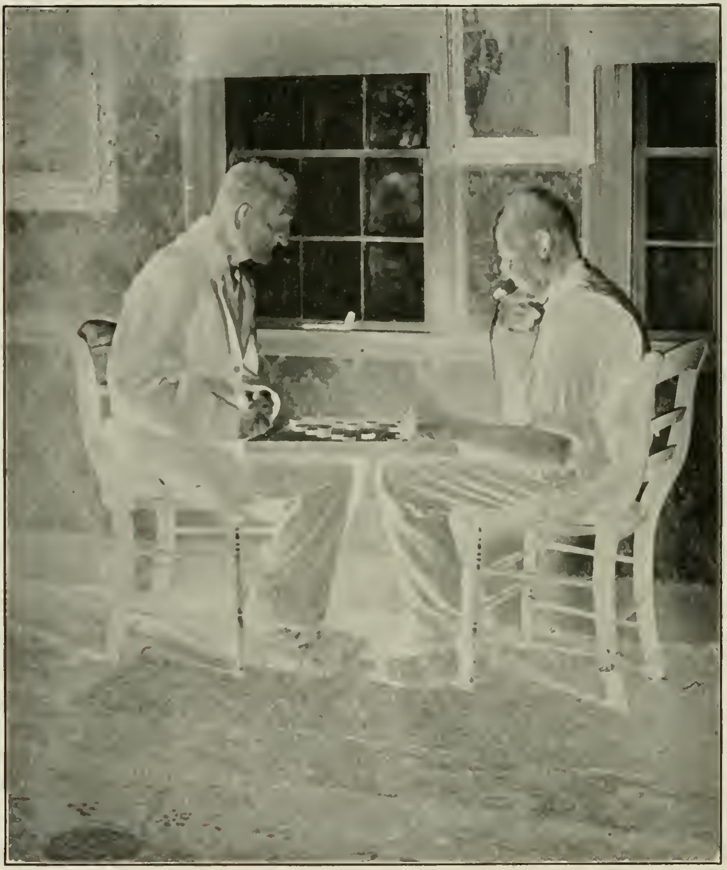

Fig. 50
A Negative possessing a good range of tones

All developers consist of several different chemicals, each of which has a specific function in helping to bring about a uniform action. The agent which plays the principal part in reducing the silver compound to metallic silver is called the reducing agent. Common among these agents are Pyro, Metol, Hydrochinone, Elon, Adurol, etc. .

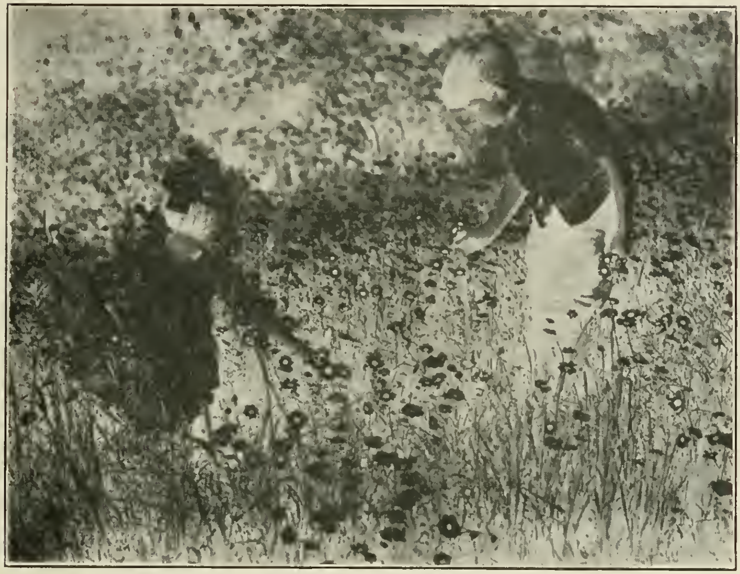

Fig. 51

A Fogged Negative

There are many reducing agents known in chemistry, but only a few are available for use in photography, because, while they must be strong enough to reduce exposed silver bromide under the proper conditions, yet if they are too strong, they will be able to also reduce the silver bromide which has not been exposed to light, so that we have to choose those chemicals which will remove the bromine from the exposed silver bromide without affecting the unexposed grains.

An alkali is usually added in the form of carbonate to increase the reducing power of the reducing agent. The most common form of carbonate used is sodium carbonate.

Inasmuch as a reducing substance has a great affinity for the oxygen of the air and thus when exposed to the air becomes oxidized and loses its reducing power, another substance which also has a great affinity for oxygen, is added to retard the oxidation of the developer; this is sodium sulphite, which retards without hindering the work of reducing. This is called a "preservative."

A fourth ingredient is potassium bromide, which acts as a controller of the other three chemicals mentioned, by holding their action in check, lest they have a too strong action in reducing.

A developer without any potassium bromide would produce a negative in which even the unexposed silver bromide had been reduced, thus producing a very flat negative (no contrasts).

Thus, in a well-balanced developing solution we have:

1. The Developer—Pyro, or Metol, etc.
2. The Accelerator—an alkali in the form of a carbonate.
3. The Preservative—sodium sulphite.
4. The Restrainer—potassium bromide.

What Happens in Fixing

The Hyposulphite of Soda (hypo) dissolves away the undeveloped grains of silver bromide and leaves only the black grains of metallic silver which form the image. But, even though this process may seem complete with the disappearance of the cream color (the unexposed silver bromide), it is not thoroughly fixed the instant this disappears, for there is still left an invisible double salt which is insoluble in water, and, consequently, can not be removed by any amount of washing. This double salt is, however, soluble in hypo, and will be entirely dissolved if the negative is left in the bath for a few minutes longer, provided the bath is of standard strength. An old, weak fixing bath works slowly and is treacherous. Negatives which have not been thoroughly fixed will discolor in time and thus be ruined. This discoloring is caused by chemical action caused by the incomplete dissolving of the silver bromide and invisible salts.

Tank Development

With all tanks, Pyro and Adurol are ideal developers.

By tank development is meant development which involves placing the roll-films, film packs, or plates in tanks of diluted developer, and developing them for a specified time with the developer at a specified temperature.

1. Roll Films in Tanks

The great factor in favor of the tank for developing is its reliability, for with it, you can feel confident that you will get an as perfect set of negatives as is possible to get, considering the exposures given.

The tank produces good printing negatives, with splendid gradations, from either films or plates which have been over-exposed, as well as from those which have been correctly exposed. Tray development cannot do this.

There is no known method of development that can produce an image which the light has not recorded, therefore, under-exposures, when developed by tray, are very often ruined as a result of prolonging the development in a vain attempt to get something in the way of detail into the unexposed portions. The fact that the film is in such constant contact with the air accounts for its tendency to fog and stain under prolonged tray development. With the tank, development can be prolonged without any danger of fogging, because the film is immersed in the developer continually, and, as a dilute developer is best for producing detail from all kinds of exposures, whether over or under, such a developer can be used by the tank method which eliminates the ordinary dangers accompanying prolonged development.

Repeated experiments by the originators of the Kodak Film Tank have resulted in such a set of principles involving time and temperature development, that they have been able to give an exact system for producing the maximum of perfection that any set of films will permit, exposures considered.

In addition to perfect gradations in all the tank developed negatives, you will find complete absence of all halation.

The beginner, wholly void of experience, can, by closely following the printed instructions furnished with every tank, turn out as perfectly developed negatives as most expert tray-workers can produce; and, other very important features are that no dark-room is needed, and the process is simple and economical.

2. The Premo Film Pack Tank

If you are to use packs frequently, I would advise you to purchase such a tank as the Premo. It enables you to develop the whole lot of ten or twelve films at one time and with a great degree of success, provided you follow the instructions given with the tank.

The same remarks made in regard to the efficacy and principles of the Kodak Film Tank apply to the Film Pack Tank, so I shall not elaborate further on this subject.

3. The Plate Tank

The plate tank is the same in theory as the film tank with such modifications as are rendered necessary by the physical difference between plates and films.

WHAT DEVELOPER TO USE FOR DARK ROOM DEVELOPMENT

It is well not to try too many developers at the beginning. To understand one thoroughly, or at the most, two, will give you results from which you will obtain more satisfaction than if you were to dabble with the various formulas on the market today.

You might start with Pyro, or with Hydrochinone, which are without doubt two of the best.

Pyro, the most popular developer among professionals, has a decided tendency to stain the fingers. If this is too strong an objection, Hydrochinone, in combination with Elon or Metol can be used with good results. The ideal method to follow is to use the developer which the manufacturers of the particular products that you are using recommend.

Developing An Under-Exposed Plate

If a plate develops slowly and no detail appears in the shadows, although the high-lights have come up quickly, it is a pretty sure sign that the plate was under-exposed. In this event, pour the developer back into the graduate and cover the plate with clean water. Then weaken or dilute the developer with an equal volume of water; stir it up to thoroughly mix it; pour the water off the plate and continue development with the weakened developer. Development will, of course, be rather slow, but when the high-lights are quite opaque, sufficient detail will probably have appeared in the shadows.

Don't attempt to weaken the developer without pouring it off the plate, as it is impossible for thorough mixing to take place in this way, and unequal or patchy development will result.

Developing An Over-Exposed Plate

If the picture appears very quickly after pouring the developer over a plate, and makes its full appearance in a very short space of time instead of coming out regularly and gradually, you may safely conclude that the plate was over-exposed. This requires prompt attention, and just as soon as there is any indication of over-exposure, the developer should be poured off and the plate covered with clean water.

You should have at hand in your dark-room a 10 per cent. solution of potassium bromide, made by dissolving 44 grains of potassium bromide in one ounce of water. Add two or three drops of this to the developer, pour the water off the plate and proceed as usual with the development. If the over-exposure seems to be extreme, add as many as five to ten drops.

How to Dry a Negative in Five Minutes

A wet negative melts very easily if placed to dry in the sun or near any source of heat; but if it is treated to a bath of Formalin it can be subjected to either without danger. Formalin possesses the property of rendering gelatine hard and perfectly insoluble.

Make the following:

Water	10 ozs.
Bisulphite of Soda	¾ oz.
Formalin	2 ozs.

For use, dilute this solution with water in the proportion of three ounces of water to one ounce of the solution.

After the negative has been thoroughly washed, lay it in a perfectly clean tray and pour over it a sufficient quantity of the solution (diluted as above directed) to thoroughly cover it. Rock the tray gently, allowing the negative to remain in the solution five minutes, after which, rinse it in water. It may then be placed in a hot place to dry.

Keep the solution in a tightly-corked bottle when not in use, as it easily evaporates if exposed to the air.

Keep Everything Clean

Keep everything that is used in your dark-room absolutely clean, and never use the developing tray for anything but developing without giving it a thorough cleaning before again using it for developing. Wash your trays every time you are through using them, and stand them on edge to dry. Keep your benches and other parts of your workshop in order and clean, at all times, and you will have less occasion to worry over stains and other troubles common to ill-kept dark-rooms.

CHAPTER VI

THE DARK-ROOM

AS the subject implies, the room in which the developing process is carried on, and in which plates are removed from their boxes, must be a room absolutely free from so-called actinic or white light. The only light permissible is a non-actinic light, such as red or yellow.

The extent to which you carry on in picture work; the amount of spare time which you have at your disposal; the amount of money that you can afford to spend on your hobby; and the disposition of the lady-of-the-house, are largely the determining factors in the matter of what you will call your dark-room.

Any room which can be made perfectly dark will answer the purpose, but a closet with no windows and only one door will usually be found the easiest to make perfectly dark.

My own experiences in this line have really been quite humorous. Mention of some of them may serve to steer you away from similar disagreeable experiments.

My first dark-room was a large pantry. A half hour was spent endeavoring to stop up dozens of nail-holes and cracks. Another thirty or more minutes was consumed in toting in boxes and developing apparatus, and when I finally got started and was well in the midst of excitedly developing my first plates, mother was rapping on the door and urging me to get out, as the "men-folks" were anxious for a prompt dinner.

But to make matters worse, my solutions were slopped around to such an extent that biscuits were bespattered with reddish developing stains; the hypo had coated things in general with whitish deposits, and the old lamp was making such a smudge from being turned up too high, that everything edible seemed to possess a smoky flavor. Some mess I made of it!

My second attempt took place in an upstairs clothes-closet, and such a job of toting water and other necessities up those stairs! Besides, it was mid-summer, and all liquids reached a temperature so near the boiling point, that my plates threatened to melt—in fact did on all the edges. Once was enough in that place.

Then came the cellar. Well, this place was not so awfully bad, for it was cool. The worst trouble was encountered in trying to efficiently keep out the light by stuffing quilts around the small but deepset windows.

I finally decided that night was the only time to do dark-room work, and this plan was carried out for a long time. It was the best system that I had tried, but the real fun came when I finally persuaded the folks to let me build a real dark-room in one corner of the downstairs bedroom.

This was not such an arduous task either, for there was a lot of pleasure in planning the little room. A tub was placed in one corner and a pipe attached to it and run out through the side of the house. Shelves were constructed for the various processes and for storing the various utensils, materials, etc., and, best of all, a 10-inch square window, blocked up with orange colored paper, was placed directly over my developing shelf. A small shelf was placed below this window, on the outside, so that I could set a lamp on it, when working at night, or on dark, cloudy days. It was a very cozy little affair, and, with the exception of having to carry water in and out, was ideal.

I shall not go further into detail regarding the construction and arrangement regarding a dark-room, because anyone with any ingenuity at all can make one provided he finds a suitable place.

It is a mistake not to construct some such room as early in the game as possible, for it is not only an aid to good work, but it will also save lots of trouble and bother to yourself and to other members of the family —a very vital consideration.

Where running water and electricity are available, by all means adapt it to your needs—the water by constructing a sink; the electricity, by procuring a red bulb attached to a cord so that it can be adjusted near-to or at a distance from your developing stand or shelf.

If using an oil dark-room lamp, be sure to keep it filled and the glass clean! Along with these precautions, here's another: Watch your ventilating system. Nothing is much more stuffy than a small room in which an oil-lamp has been burning for some time. So be sure that you have some way of permitting fresh air to enter your workroom.

Whenever you decide to construct a real dark-room with complete equipment, it will be well to secure a book on the subject and make a good serviceable room in every detail.

In the American Annual of Photography for 1920, on page 102, is a splendid article by Carl A. Peterson, on "An Amateur's Dark-room." It is well illustrated and very clearly written. The book in question can be secured of almost any dealer in photographic supplies, or by sending to Percy Y. Howe, the editor, at 422 Park Hill Avenue, Yonkers, N. Y.

The Annual for 1918, on page 106, contains another excellent article on the subject; it is entitled "A Combined Dark-room and Enlarging Chamber," by H. E. Balfour.

CHAPTER VII

BEGINNER'S TROUBLES— SERIES NUMBER 1

A Summary of Difficulties Encountered at Times in Handling the Camera and an Explanation of Faults in Negatives

AS it is necessary to make use of several technical terms in this chapter I will start with a list to which you can refer at the appropriate time.

TECHNICAL TERMS

"Brilliant"—a term expressing brightness in the negative. It is neither too dense, nor too thin, but, at the same time, possesses considerable contrast between the high-lights and the shadows.

"Dense"—a term applied to a negative that is black all over.

"Contrasty"—a term applied to a negative that has very black high-lights and very thin shadows.

"Distortion"—an effect in which objects in the picture are out of proportion to their corresponding positions or sizes in the original.

"Fogged"—applying to a negative which possesses no clear or transparent places even in the shadows. Such a negative has a smoked appearance.

"Flat"—said of a negative possessing very little contrast between high-lights and shadows. A negative can be very dense and yet be flat.

"Frill"—when the gelatine surface softens around the edges to such an extent that it puckers, or even breaks away, it is said to frill.

"Halation"—a spreading of the high-lights into the shadows.

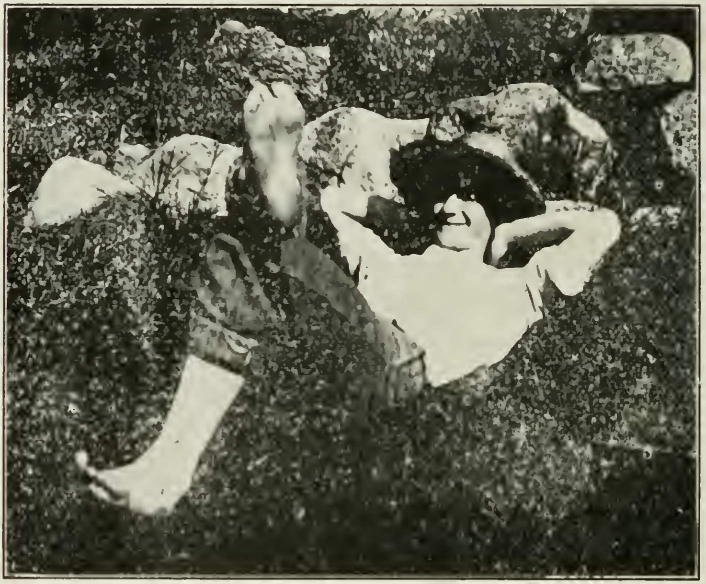

Fig. 52

Distortion—The shorter the focus, the more the lens is apt to distort. This particular picture is, of course, an exaggeration

"Hard"—said of a negative which has been developed so far that detail in the high-lights is practically, or wholly blocked (will not print out, without over-printing the shadows).

"High-lights"—the darker portions of the negative, which really represent the lighter parts of the picture itself.

"Light-struck"—said of a negative which has been affected by white light other than through the lens.

"Over-exposed"—a negative from a plate, or film, which was exposed so long that the image came up strong and black all over the surface in just a short space of time after being placed in the developer.

"Over-developed"—a negative which has been left so long in the developer that the high-lights have become extremely black; an over-developed negative is also a "hard" negative.

"Plucky"—a synonym for "brilliant."

"Reversal"—the image or portions of it being positive instead of negative or vice versa. Caused by extreme over-exposure or exposure to white light during development.

"Reticulation"—the surface of the film, when removed from the wash, appears almost like a zinc or copper plate—covered with depressions and raised portions. At times it will occur to such an extent as to cause what appears to be scratches on the film. Caused by warm solutions and old hypo bath which cause the film to pucker.

"Shadows"—the thinner portions of negatives, representing the darker portions of the picture itself.

"Snappy"—a synonym for brilliant.

"Soft"—a negative that is lacking in density and contrast.

"Thin"—a synonym for weak.

"Under-exposed"—meaning that the film or plate was given so little exposure that the negative came up very slowly in the developer, and with very little detail.

"Weak"—possessing very little density, even in the high-lights.

"Under-developed"—meaning that the negative was removed from the developer before even the high-lights were brought out sufficiently.

Over-exposure and under-development usually go hand in hand with a beginner, for he has a tendency to yank the negative out of the developer just as soon as it turns dark, whereas he should leave it in, just as long as he would a normally exposed plate.

Vice versa, under-exposure and over-development travel together, for the beginner is very apt to prolong the development in a vain effort to make the very white shadows of the negative turn dark, or possess detail. Such a procedure will either make the negative extremely contrasty, or fog it.

Now that this list of technical terms is complete, we will proceed with the discussion on "difficulties" and "faults," taking up only the most common difficulties and those which give the beginner the most trouble.

Many so-called difficulties, listed in books of this kind are so simple that anyone with enough common-sense to own a camera could master them without being told how.

DIFFICULTIES AND THEIR CAUSES

Difficulty No. 1—*Inability to See the Image on the*

Finder or on the ground glass—Too much strong light entering at the wrong place. If a finder, shade it with the hand. If a ground glass, be sure that no light reaches it except through the lens.

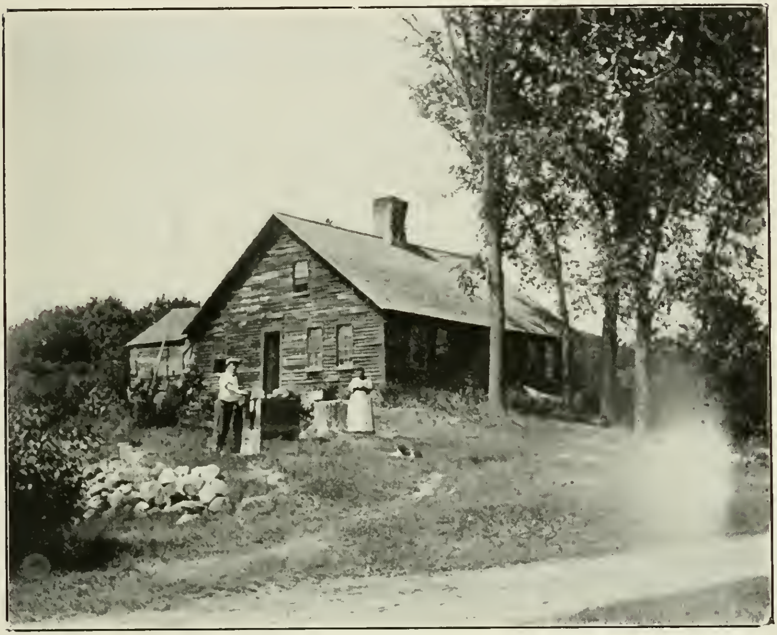

Fig. 53

Illustration of Result of a leaky Plateholder—a light-struck plate. By *Cyrus Rundlett*

Difficulty No. 2—*The Negative is not Sharp When a Hand Camera is Used*—Either the distance was improperly estimated, or the pointer on the scale gauge was set on meters instead of on feet. Or, possibly the image was blurred by jarring the camera when taking the picture ("pressing the button").

Difficulty No. 3—*Perpendicular Lines in the Subject Photographed Appear Oblique on the Negative*—Camera was tilted when the picture was taken, thus throwing the plate or film out of a vertical position.

Difficulty No. 4—*Distance Not Sharp*—Caused by using a large stop with the foreground as the principal point of sharp focus. In order to secure sharpness throughout the negative, a stop smaller (at least as small) than F or U.S. 16 with the focusing pointer set at 100 feet must be used.

Difficulty No. 5—*Foreground Out of Focus, But Distance Sharp*—The trouble is self-evident, for all but fixed-focus cameras, and in the latter case it should be remembered that very few fixed-focus cameras will render the foreground sharp, closer than 6 to 9 feet to the camera.

Difficulty No. 6—*Inability to Insert the Plate holder Slide*—The plate was not properly adjusted in the holder. Be sure, when loading plate holders, to push the plate as far into the lower end, against the spring, as possible; then the top end will sink sufficiently low to permit of pushing the slide all the way in.

Whenever such a difficulty as No. 6 does arise, don't use force in trying to insert the slide—take the camera into the dark-room and adjust the plate properly.

Difficulty No. 7—*When Turning the Next Film Into Place, It Suddenly Binds*—You were not careful when inserting the roll, to wind it squarely in the middle of the empty spool. If it sticks too hard, the only solution is to remove it in the dark-room and re-wind it to the proper point.

Difficulty No. 8—*Inability to Tell Which is the Film Side of the Plate*—The film side has a dull surface. The finger when moistened will stick to it. Touch only the corner, when testing it in this manner. The glass side will show a clean-cut reflection of the ruby light.

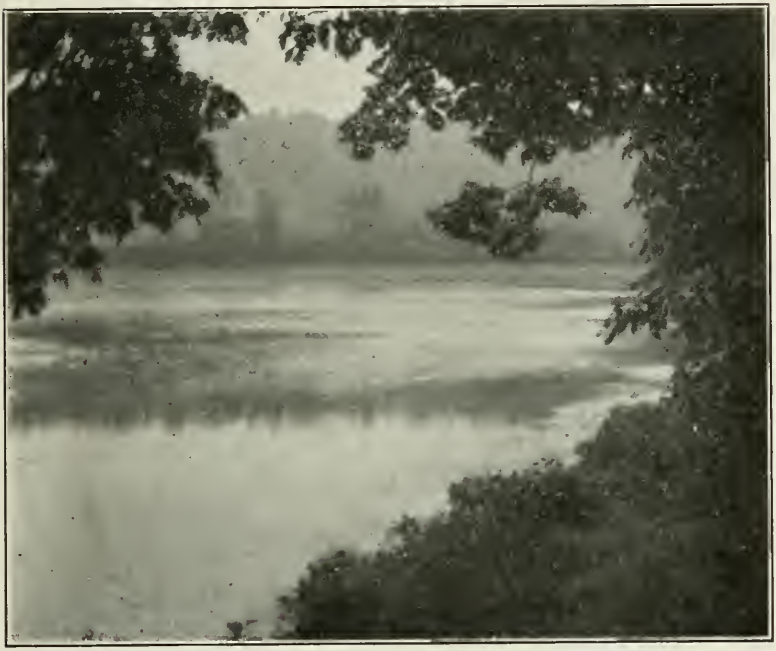

Fig. 54

Summer Haze—Aerial Perspective increased by haze

Difficulty No. 9—*Chemicals Will Not Dissolve*—This trouble is quite common when you are mixing your own solutions, the principal trouble-maker being Sulphite of Soda. Keep in mind two very important points when making solutions: 1. Mix the chemicals in the exact order as called for in the table (formula) and thoroughly dissolve each ingredient, in turn, before adding another, otherwise your solution may be cloudy, and thus practically useless. 2. Pour in each powder slowly, stirring constantly the meanwhile, or, if pouring sulphite of soda into a bottle, pour in a small quantity at a time and shake immediately.

Difficulty No. 10—*Part of Picture is Distorted*—That is, portions of the picture closest to the lens are large in proportion to the rest of the picture, as compared with the original.

This occurrence is caused by using a lens of short focal length close to the subject photographed.

It is a good rule to use a lens which has a focal length at least equal to the diagonal of the plate. A little more length is better.

Faults in Negatives and Their Preventions

Fault No. 1—*Pinholes*—These consist of small transparent spots, and are caused almost invariably by particles of dust which were on the film when it was exposed. If plates are used, they should be dusted carefully with a camel's hair brush before being inserted in the plate holder. Occasionally, the holders themselves should be tapped and giving a good blowing with the breath, to rid them (inside) of excessive accumulation of dust. Pinholes cause black spots on

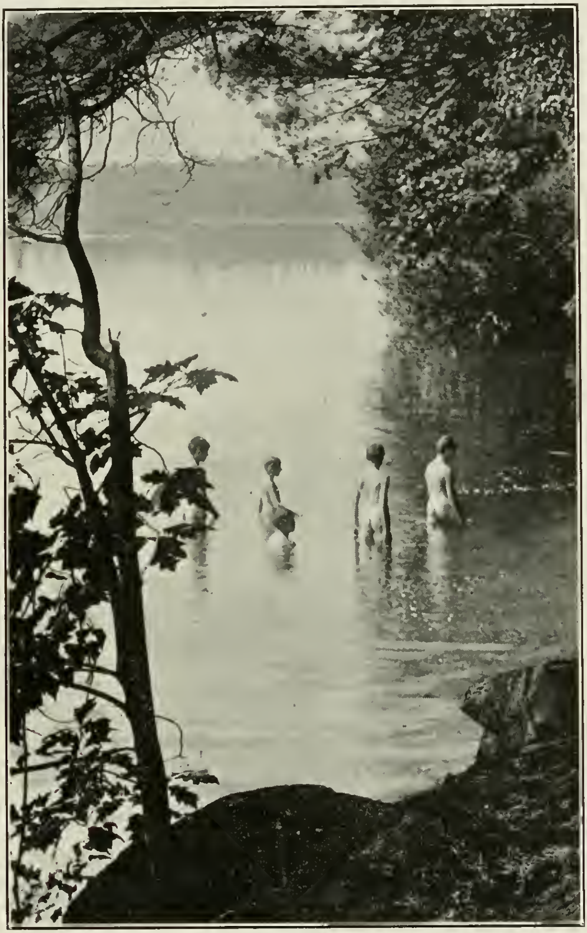

Fig. 55

The Swimming Hole—Aerial Perspective improved by using an orthochromatic plate and ray filter. Without the combination, the far shore would have been lost in the reproduction the prints. Films can not be brushed, but dust troubles affect them very little.

Fault No. 2—*Round Transparent Spots*—These are caused by the formation of air-bubbles on the surface, during development. If plates are used, it is a good plan to run a swab of cotton over them just as soon as they are covered with developer. If films, run them through water until limp before developing.

Fault No. 3—*Fine Transparent Lines*—These are caused on films by winding them when the camera is closed, the film rubbing against the folded bellows of the camera. If they persist in spite of proper care, or occur in box film cameras, there is a defective piece of workmanship somewhere.

Fault No. 4—*Opaque Spots and Lines*—These are due, mainly, to solid particles, possibly undissolved chemicals in the developer. Care should be taken to keep solid particles out of all solutions, and out of the wash water, as well.

If the dark-room is sloppily kept, i. e., solutions spattered around and allowed to dry, the air will be full of chemical dust which will settle on plates and in solutions.

Fault No. 5—*Uneven Density, or Mottled Appearance*—Uneven density is caused by failure to cover the plate or film evenly when starting development, or by permitting portions of it to be exposed too long to the air during development.

Mottled appearance is caused by not keeping it continually in motion during development.

Fault No. 6—*Yellow or Brown Stains*—These are caused by keeping the negatives too long in a Pyro solution; or by using a stale, discolored fixing bath; or by dirty trays; or by using insufficient or decomposed sulphite of soda; or by too warm or too strong developer; or by insufficient rinsing before fixing; or by exposing the negative too frequently to the air during development.

To remove Pyro stain, wash well to free from hypo, and then place in the Clearing Bath for Pyro Stains given in Chapter XVI.

Fault No. 7—*Black Streaks*—This is due to white rays of light striking the film from some other source than through the lens. The bellows may be leaky. Pushing in the plate holder slide cornerwise, or with the sun shining directly on the plate holder slit is very apt to let in light. Light may be entering your darkroom through cracks or holes; or your lamp may leak white light.

Such a plate is said to be light struck—there is no remedy for a plate so damaged.

Fault No. 8—*Spreading of the High-lights*—This is due to "halation." It happens when photographing extremes of contrast, such as interiors in which windows are photographed; or bright light streaming through foliage; or pictures including the sun, etc. It is caused by the high-lights extending beyond their proper boundaries.

Use of specially prepared plates, such as "double coated," and "backed," will prevent it to a large degree. Films, as now prepared, being coated on each side, are practically proof against halation, except in very extreme cases.

Fault No. 9—*A White or Frosty Appearance*—This condition is frequently noticed on dried negatives, maybe several weeks, or even months after they are washed. It is due to incomplete elimination of the hypo when washing. i. e., incomplete washing. When discovered, fix them again and wash.

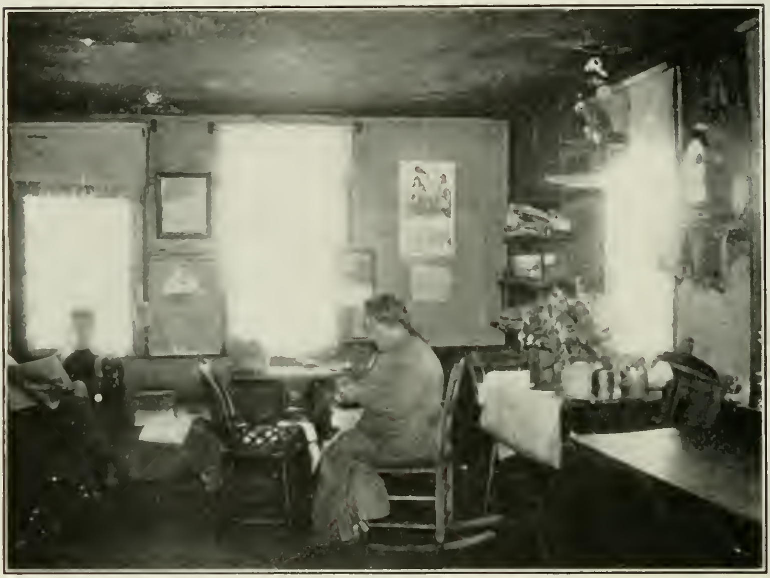

Fig. 56

Halation—The bugaboo of good pictures

Fault No. 10—*Yellowish Blotches After Drying*—This is due to incomplete fixing. Fix again!

Fault No. 11—*Under-exposure*—If the negative has very black high-lights and very thin shadows (practically no detail showing), it indicates that the plate was under-exposed, provided the developer is not too strong, or containing an excess of alkali.

Under-exposure is common in photography, in spite of the fact that nine of every ten such exposures could easily have been avoided. There are two old rules, and mighty good ones to follow: One reads—"Expose for the shadows and develop for the high-lights." The other says: "When in doubt, err on the side of over-exposure." The reason is just this: If you over-expose you get all the detail there is to be gotten, and by careful development you will have a negative that will be a good printer, even though a slow one. Furthermore, when it is too dense, it can be reduced.

On the other hand, if the plate is under-exposed, no method of development will produce a good negative, because the exposure was not long enough to record detail in the shadows; therefore there is no detail to be brought out, for, where the light has made no image, there is none to be developed.

Because your camera happens to have a shutter which works at 1/100 of a second, you should not suppose that this speed is correct for all objects, even in the brightest of sunshine. In fact, that speed is rarely needed in ordinary work where there are trees or bushes in the foreground; or for work in cities and towns where dark objects are within 100 feet of the camera. If you have been making under-exposed negatives try making others of the same subjects under exactly similar conditions, giving four times as long an exposure as you gave before.

In making exposures, the size of the stop used is as important as the shutter speed. If the stops on your shutter are marked 4, 8, 16, 32, and 64, you should remember that stop 8 will admit just twice as much light as stop 16, and just half as much as stop 4. In other words, each stop number indicates that when the stop lever is set on that number the lens admits half as much light in a given time as it does when the lever is set on the next lower number, and twice as much light as when set on the next higher one. Hence, if you have made an exposure of 1/10 of a second, using stop 16, your film received exactly as much light as it would have received had you given 1/5 of a second using stop 32, or 1/20 of a second, with stop 8, or 1/40 of a second with stop 4.

If your exposure was on a subject in the shade, out of doors, and you gave 1/50 of a second with stop 16, and the negative showed under-exposure, don't go to the extreme of trying this over again (under similar conditions, at the same time of day) with a time exposure of 3 seconds. This would be 150 times as much exposure as you gave before, while the correct exposure would probably be only 4 to 6 times as long as the first. Four times 1/50 would be about 1/12. Since there is no 1/12 speed marking on your shutter, and you wish four times as much light to act on the film as acted before, you can obtain this result by leaving the shutter-speed at 1/50 of a second, but moving the stop lever to 4. Now you have made the stop opening 4 times as large as it was before and the lens will admit 4 times as much light as the same shutter-speed.

To repeat what was shown above, 1/100 of a second with stop 4, 1/50 of a second with stop 8, and 1/25 of a second with stop 16, while different combinations of stops and shutter-speeds, have nevertheless permitted exactly the same amount of light to reach the film.

Guard against the evil of under-exposure; have the exposure as correct as possible, but have it ample!

If you make a mistake and over-develop an under-exposed plate refer to Reduction in the Index.

Whenever you are sure that the plate is under-exposed, and it is worth a lot of extra work, you can help it a lot by using a developer of your own compounding, using a regular formula but with only about one-half the amount of carbonate of soda called for in the formula, as an excess of alkali blocks the whites.

Fault No. 12—*Over-exposure*—If the negative has plenty of detail in the shadows, but is very black all over, the plate was over-exposed. Usually such a negative is flat (without any contrast) because the beginner has a tendency to yank such a plate out of the developer before it develops sufficiently, the suddenness with which the plate turns black all over frightening him, so to speak.

It is best to leave an over-exposed plate in the developer just as long as you would if it had been properly exposed, for this will insure against flatness; and then, the negative can be reduced, or printed on soft paper.

If you are prepared, by constantly having in your dark-room a 10 per cent solution of potassium bromide, you can help an over-exposed plate a lot by removing it from the developer the instant you see that it is over-exposed, while you add five or more drops of the bromide solution. It will do no good unless you add it before the development proceeds to any extent.

Fault No. 13—*Fogged Negatives*—There are two kinds of Fog—Light Fog and Chemical Fog.

Light Fog

If there is a general darkening or blackening of a negative all over, even in the parts which should be almost transparent, the negative is fogged. If the fog extends evenly all over the entire plate, including the narrow margin of clear glass along the edge, the probability is that the trouble was caused by an unsafe dark-room lamp. The lamp may actually leak white light, or it may simply give such a bright ruby light that it affects the plate while it is being developed. If your light is bright enough to affect the plate it should be covered with one or more thicknesses of either post-office paper or ruby fabric. The safest light is one in which both an orange and red, or a yellow and red glass is used.

If the margin of the plate is perfectly clear and the fog therefore entirely confined to that portion of the plate which was exposed, the cause is either over-exposure, or a dirty or dusty lens.

Watching the negative develop by holding near the lamp is a dangerous practice, for it is almost sure to cause fog. In fact it is quite possible to spoil the negative altogether, and thus to get a film that is partly negative and partly positive by holding it too close to the lamp, too frequently when judging its density.

Tank development is the greatest insurance there is against fogging during development.

Chemical Fog

Chemical Fog is caused by old plates; unclean trays; prolonged development; developer too warm, or too strong; too much alkali in the developer (the alkali is Sulphite of Soda, and Carbonate of Soda) without enough restrainer (Potassium Bromide). Hypo in the developer will also cause fog.

Fig. 57

A Real Load—Aerial Perspective produced by extreme softening of the focus in the distance

If chemical fog occurs, use the developer cooler, or more diluted, and add a few drops of Potassium Bromide solution containing 1 ounce of bromide of potassium to 10 ounces of water.

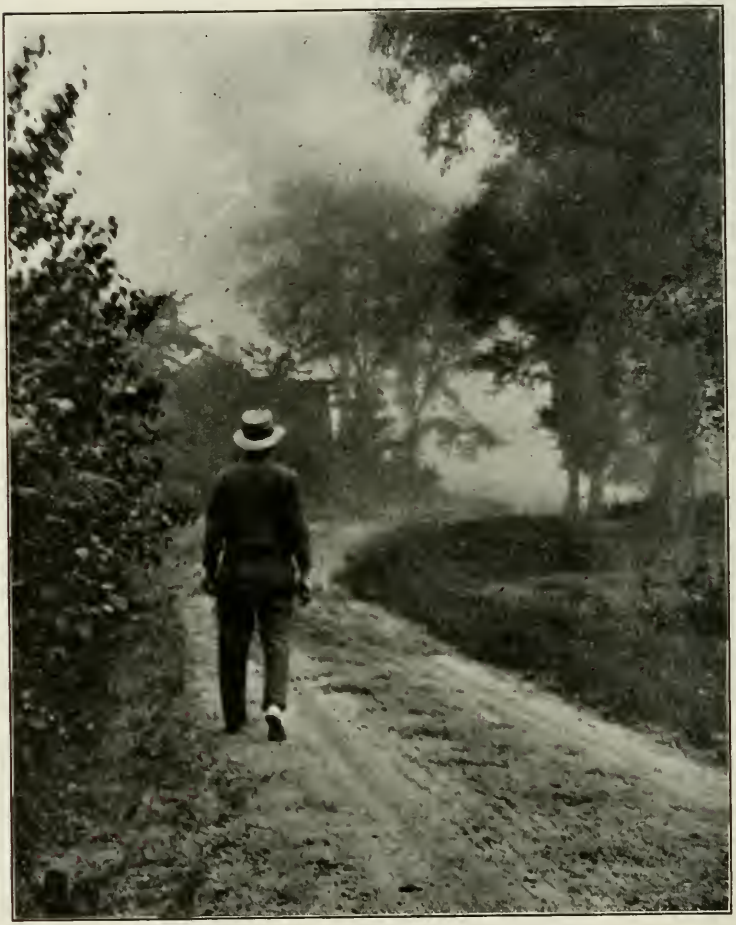

Fig. 58

Into the Mist—Mist pictures, properly developed, are beautiful examples of atmospheric effects. By *Jim Virtue.*

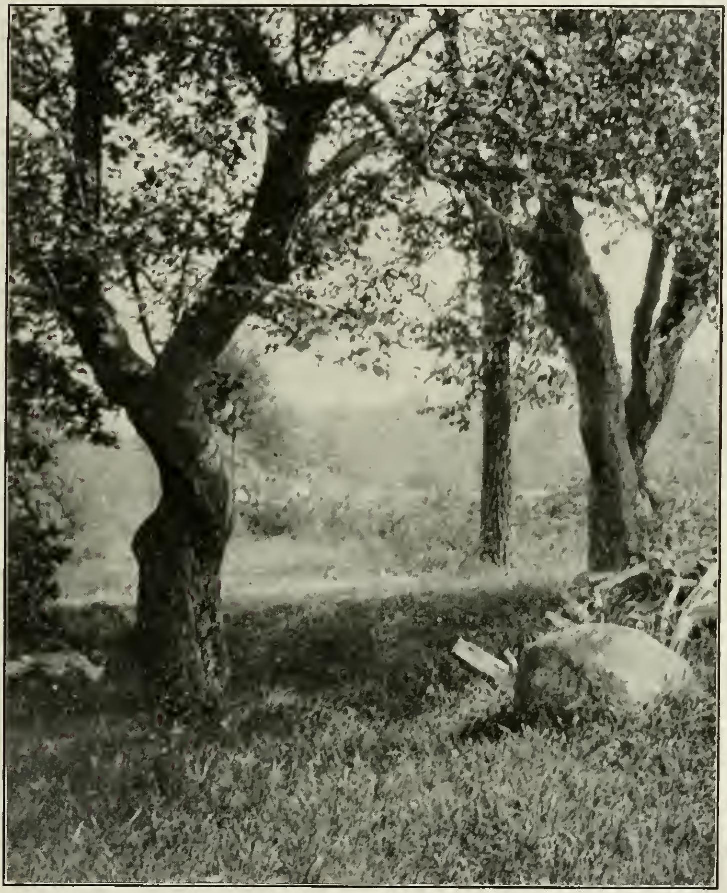

Fig. 59

Sentinels of the Yard—Here is an example of aerial perspective produced by extremes of light and shade—heavy shaded foreground, full exposure, and bright, sunny distance. By *John Hubbard.*

Fault No. 14—*Edges of Negative Are Fogged*—If, after development, the edges of the negative are dark and fogged while the center is much clearer, the plates are old. Every package of plates, films, and papers is guaranteed to be perfect up to a certain time limit; after that limit they are likely to deteriorate.

Fault No. 15—*Black Round Spot Near the Center of the Negative*—This is caused by "flare," due to a defect in the lens. It is very apt to occur if the lens is pointed towards the sun, as the sun tends to reflect from the lens to the film.

Fault No. 16—*The Negative Dries Slowly*—The room is too cold, or too damp, or poorly ventilated.

Fault No. 17—*Negative Appears Greasy When Dry*—Caused by insufficient washing, or failure to swab off the surface with cotton, after washing. An old hypo bath that is discolored tends to produce this effect. Always use fresh hypo if the old is discolored, or "sudsy."

Whenever your negatives are greasy and covered with a sort of scum, after washing awhile, place them in a Clearing Bath of Water 8 ozs., Sulphuric Acid 8 drops, Sulphite of Soda four pinches, swab them off and continue washing them.

Fault No. 18—*Fixing Bath Turns Milky When Made*—You have disregarded the manufacturer's instructions which state that the hypo must be thoroughly dissolved before adding the Hardening Solution. Or possibly you have not dissolved the ingredients of the hardening solution in the order given. Again, possibly the chemicals used, if you have compounded the solution according to formula, are impure.

Prints fixed in such a bath will probably turn yellow inside of a year.

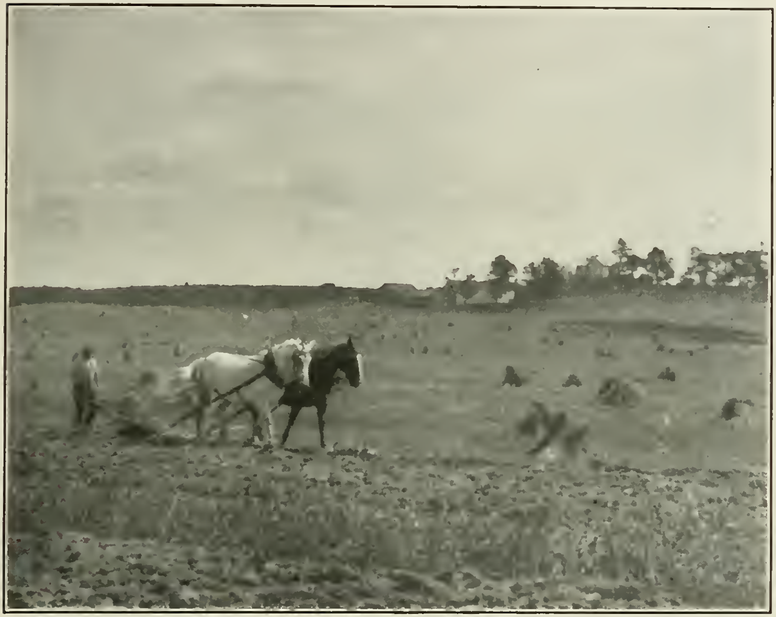

Fig. 60

The Husbandman—This picture was taken when the air was clear of all haze, and only by softening the focus in enlarging, was any effect of atmosphere produced.

Fault No. 19—*High-lights Almost Opaque*—This is due to over-development. If the plate was properly exposed, and then over-developed, it is not necessarily spoiled, for it can be reduced. If, however, the plate was under-exposed and over-developed you will have a very harsh, contrasty negative, and an unprintable one, at least for pleasing results. Proper reducing will possibly help it somewhat.

Fault No. 20—*High-lights Very Thin*—This is due to under-development. If the plate was properly exposed or even slightly over-exposed, the negative can be greatly improved by intensification, i. e., provided it has been developed far enough to bring out at least a trace of detail in the shadows.

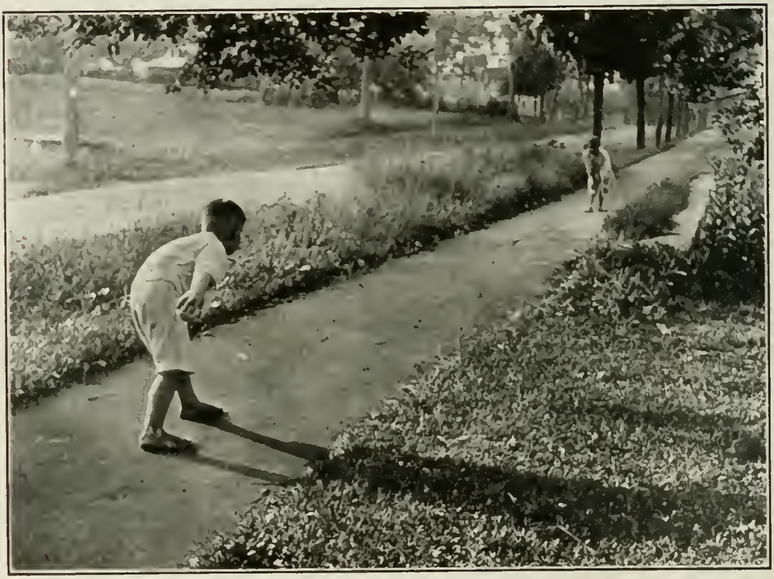

Fig. 61

Happy Hours of Childhood—An example of Linear Perspective

Fault No. 21—*The Film Puckers Up Around the Edges*—Caused by having the solutions too warm. The water may be too warm. An Acid Hardening Bath will serve as a preventative of this trouble, unless it starts while the negative is in the developer. Such puckering of the film is called "frilling."

Fault No. 22—*Surface of Negative Blisters*—Caused by a difference in temperature between the developer and the wash water, or by water which contains a considerable amount of air running from the faucet directly onto the negative, the air thus raising the surface of the film by being forced under it.

Fig. 62

The Morris Canal—A good illustration of both kinds of perspective

Use of a hardener in the fixing bath will serve as a check against blistering caused by solutions of different temperatures.

Fault No. 23—*Negative Film Puckers All Over*—Such an occurrence is called "reticulation." It is due to a warm developer. The remedy is to leave it in the acid fixing bath for a half hour in order to harden the film clean through.

Fault No. 24—*Negative Looks Like a Positive Instead of a Negative*—The dark-room light is probably unsafe. Reversal, as it is called, occurs only when the negative is fogged after partial development. Fog previous to development merely darkens the plate all over. It is possible for reversal to be caused by extreme over-exposure, or by a trace of hypo in the developer, due to trays not being thoroughly cleaned.

Fig. 63

Longing for the Rain to Cease—A close-up of Linear Perspective

Fault No. 25—*Metallic Appearance on the Negative*—This can be removed by rubbing the surface with cotton while the negative is wet, or by treating as for chemical fog.

CHAPTER VIII

PRINTING, DEVELOPING AND FIXING THE PICTURE

I MADE the statement in the opening chapter that picture-taking is exuberating; now we come to a phase of the work that is truly fascinating. Printing is to the amateur photographer what eating the spoils of the hunt is to the hunter, and I am really sorry for the enthusiastic picture-taker who is content to have his printing done, except in emergencies, by other talent than his own.

I approach this chapter with a deep sense of responsibility, for I realize that the opportunity is before me, if I can only use it as I would, to save the beginner a great deal of wasted time and paper, say nothing of groping around in a vague manner, trying to decide what is best to do under certain conditions.

Presuming that you who are reading this are a beginner, let me first tell you about a few of the problems that will confront you, then I will try to give you the best advice that I can as to just how to proceed.

Now that you have made a set of negatives, and are ready to print from them, you will wonder what kind of paper to buy, and if you go to a supply dealer, you will see so many different kinds of paper, and such a variety of grades, that it will all appear "dutch" to you.

Again, perhaps, among your friends, several have advanced just far enough into the game to have reached the experimental stage, as a result of which they are not contented until they have tried every paper on the market. Each friend may recommend to you a different paper, and, unless you know just what you intend to do, at the start, you will be tempted to try out a variety of papers, and before you know it, you have wasted a lot of good time and money and will still be about where you started as far as a real understanding of the printing process is concerned.

Personally, I made just this mistake. I read all about the different kinds of paper of a certain make that I ought to have, so I purchased several dozen of each kind and grade. My general results were so poor, as a result of not knowing how to adapt the paper to the negative, that I blamed the paper, consequently decided to try a different make.

This procedure was continued until I had on hand a huge collection of muddy and faded-out appearing lot of pictures.

Living as I did in the country, with no place to go for advice or criticism, it was only after a lot of reading and experimenting that I finally settled upon one make of paper, and stuck to it until I was making pictures with real pleasing tones. Furthermore, I decided that two grades of this paper were all that were necessary for the common run of my own or any other amateur's negatives. The make of paper and grades were given you in the list of equipment.

Azo was my choice because it was so easy to manipulate on account of its slow-working characteristics, and because of its moderate cost. Velox, Cyko and other high grade papers certainly give beautiful results when printed correctly, but because of their rapid action when developing, they are not as easy for the beginner to handle as Azo.

Printing paper in the hands of beginners must possess a wide range of treatment, for the beginner is pretty sure to overprint, or to force his paper in the developer as a result of under-exposure in printing, and with fast printing papers, forcing in the developer, i. e. leaving them in longer than judicious, will result in stains, and, if overprinted, they will develop so fast that they cannot be taken out of the developer before they are too dark, without danger of being streaky.

After you have mastered the fundamentals of printing, then, by all means, try the more expensive papers, for, by that time, you will be making better negatives. Your subjects, at first, will be of such a nature that the quality of tones which you get in printing will not matter so much, as your pictures will be mostly of people, animals and houses, but when you begin to enter the artistic realms of photography, and do landscape work, the tones which you produce on your paper will be a big factor in producing real pleasing pictures. For the present, then, forget expensive papers and the dozen or more grades mentioned in catalogs, and start with the paper which I listed under Equipment.

There are two distinct processes of printing; one is the process involved in using so-called Printing Out Papers; the other is the Developing Out process.

In the first, paper is used on which the picture appears as it prints. The image is preserved by a process called Toning. The red proofs which you receive from your professional photographer when you have a portrait taken are made on P. O. P. (printing out paper). These papers require sunlight, strong daylight, or extremely strong artificial light.

In the second process, no trace of the picture, whatsoever, appears on the surface of the paper during exposure. It appears only after development, and on the same principle as the plate when it is developed. Such papers are called D. O. P. (developing out papers).

More skill and practice is required to secure correctly printed and developed pictures by this process, but, today it is practically the only process used by amateurs; therefore it is the only one that I shall take up in detail. The Blue Print, Platinum, and other less-generally used processes will be omitted.

In proceeding I will treat the subject under the following headings: Equipment for Printing; Arranging the Equipment; Making the Exposure; Developing; Fixing; Washing; Drying; and More about Printing (Advanced).

1. Equipment For Printing

When ready for the process of printing, collect all of your equipment and have it at your fingers' ends ready to proceed. I usually mix my solutions first, and, while they are thoroughly dissolving, I assemble all of my other paraphernalia according to my list, so that everything is in readiness for action.

The Equipment Needed For Developing Papers

Negatives (protected)
Tray for developing
Tray for rinsing
Tray for fixing
Dish for washing
Light for printing
Strip of oil-cloth
Wad of absorbent cotton
Watch, clock, or other device for timing the exposure
Squeegee roller
Ferrotype plates (tins)
Trimmer for cutting paper.

Azo paper F, Hard X, 3¼ x 5½ (this is contrasty, glossy paper)

Azo paper, F, Soft, 3¼ x 5½ (this is soft, glossy paper)

Box marked "Contrast Test Slips"
Box-marked "Soft Test Slips"
Developing solution
Fixing bath
Graduates
Stirring rod
Print paddle
Thermometer
Printing frame
Plain clear glass for the frame
Printing masks
Scissors
Towel
Sheet of heavy cardboard

A word or two of explanation regarding several of the pieces of equipment listed:

You will observe that two kinds of Azo are given here—Azo F, Hard X, and Azo F, Soft. These terms represent different degrees of contrast, Hard X being a term signifying contrasty. It is used in printing from thin and flat negatives. Soft is a term signifying very little contrast, and is used in printing from contrasty negatives such as your over-developed negatives. As you will discover, later on, soft paper will improve your prints, even from negatives that are not especially contrasty, but for the present we are to consider it in connection with contrasty negatives, only.

There is one other degree of contrast in negatives for which special kind of paper is made, and that is the medium degree of contrast, but in order not to confuse you with remarks about too many terms and kinds of paper, just now, I am advising your using only the two in question. Further on we will open up on the various Grades and Degrees of Contrast as related to negatives and papers.

During your attempts at printing, use the Hard X on your thin negatives and your Soft on all the others—do this and you will do well enough for awhile. Now to continue with explanations regarding some of the pieces of equipment:

Azo Paper:

Glossy paper is recommended because it adds to the brilliancy of small pictures; the size, 3¼ x 5½, is recommended on the assumption that your camera is the size that was recommended in Chapter 1—size 2¼ x 3¼, for the 3¼ x 5½ cuts nicely into such a size by dividing it through the middle. It is a convenient size to use because post-cards can be made with it, by using a mask, if desired, and by cutting it in half, the 2¼ x 3¼ size is secured at a cheaper rate.

Some glossy papers are subject to "abrasion" marks—something like scratches, but I have not found this trouble to exist in connection with Azo. At any rate, special developers can be made or bought that will prevent this trouble.

Box of Contrast Test Slips

One or two cards of the Hard X grade should be cut into slips, one inch wide, and three and one quarter inches long to be used as test-slips in determining the proper exposure.

Box of Soft Test Slips

For the same purpose.

Print Paddle

You can secure this article at your dealer's. It is a hard rubber device for moving the pictures about while in the fixing bath.

Glass For Frame

If using a printing-frame larger than the negatives, or if using films, it will be necessary to lay the negative on such a piece of glass in order to print.

Printing Masks

These are black, opaque cut-outs which are placed over the negative so that a white margin can be given the picture.

Light For Printing

Printing can be done by daylight, or by artificial light, but as daylight is so uneven in intensity, because of clouds, etc., artificial light, such as electric, gas, and oil is much better. Then too, the extra amount of preparation that use of daylight entails is a very important factor reacting against its use; besides, "developing out papers" print so rapidly in daylight that it is very difficult to time the printing.

With this argument in favor of artificial light, my instructions will be given, based on this system. The Welsbach gaslight, or the Mazda electric light are usually preferred to other illuminants on account of their great intensity. There are several printing machines on the market that, if one can afford to purchase, are very desirable and efficient.

When gaslight is used for printing, a very convenient arrangement is a by-pass valve or pilot-light, which controls the supply of gas to the burner. When this valve is closed only enough gas passes to keep the burners lighted, and the exposure is made by opening the by-pass. This arrangement can be still further simplified by having a spring to close the by-pass, and a cord to open it when ready to make an exposure.

The light from a kerosene lamp is also satisfactory, and a large round wick kerosene lamp gives nearly as much light as a flat-flame gas-burner. The wick must be well trimmed and the flame should always be kept at the same height when printing.

The usual 16-candle power electric lamp will print in about the same time as the flat-flame gas burner. A 32-candlepower light will reduce the time of exposure by one-half.

Developing Solution

There are many good developers, both in powder and in liquid form. Tube powders are very convenient and most commonly used. Weighing out and mixing your own solutions is the most economical method, but the most convenient form of all is the concentrated solution form, which, to use, simply requires diluting with water.

Tube developers can be secured at any supply house, and most of the chemicals at any drug-store. It is not advisable, however, to use any other chemicals for photographic processes than those put out or recommended by photo-supply houses, because impure ingredients in photographic solutions cause a lot of trouble.

Further on, in a special chapter on solutions, you will find all the information you may need on mixing your own solutions.

A very popular concentrated solution developer is Nepera, because it is known as a universal developer, in that it can be used in almost any kind of developing-out and bromide paper development and it is also a very good film or plate developer.

Important—Pyro is not a paper developer.

2. Arranging the Equipment

Place the three trays on the table (covered with oil-cloth or newspaper) in the following order:—

DEVELOPER	WATER	HYPO

If the developing tray has been used for developing with Pyro, it should be thoroughly washed out to prevent stains. NOTE:—All trays should be washed immediately after use and before drying. Whenever the inner sides become coated with chemical deposits, they can be quickly washed by pouring in an ounce of water, then adding a few drops of Hydrochloric Acid, and rubbing with a wad of absorbent cotton. They should then be rinsed with fresh water.

The washing, if in a dish, should be done to the right of the fixing bath and in a sink, if possible.

Place the negatives in two piles, preferably on a small stand or shelf at the left of the developer, and by all means, keep them where nothing can spatter on them. Place the dense, the contrasty, and the harsh negatives in one pile, and the thin, flat, and the weak negatives in the other pile.

The printing paper, masks, scissors, test-slips, and printing frame should be arranged conveniently on this same stand.

If the illuminant is such that it can be so placed, it should be back of the trays, and the large card-board should be so erected as to completely shade the printing paper stand and the trays. The ideal arrangement for illuminants is that which permits of one source for printing and another source for developing, because it is possible for paper to become fogged while developing even though well shaded, if the light is real brilliant.

With facilities for two oil lamps or two electric bulbs, one can be encased in a yellow-colored paper, as the developing light, and the other can be turned on only while making the exposure. If the shading arrangement first mentioned is used, it is advisable that a sheet of cardboard be placed over the tray during the early stages of development, at least until the image is well started.

I find it convenient to place the towel across my knees, if sitting, and attached to my belt, or hip-pocket, if standing.

The solution which each tray should contain, should be prepared exactly as directed. Do not be too sparing of the amount of solution used, especially the fixing bath. For fixing three or four dozen prints, 4 x 5 inches, use a full pint, and do not keep it after using, as a fresh bath will give the best results. The temperature of the solutions is important. The developer should be at 70 degrees Fahrenheit, and the fixing bath and wash water 50 degrees Fahrenheit in order to secure the best results, which means the best possible prints.

3. Making the Exposure

If using the shaded light system, I advise testing the safeness of the light before proceeding. Cut off a small strip of the "soft" paper and lay it near the developing tray, covering one-half of it, and leaving the other half exposed to the light in which the developing is to be done, for about thirty seconds. Then develop the strip, and should the part which was covered show any difference in color on developing from that which was uncovered, it will be obvious that the light is not sufficiently safe.

To proceed:—Take one sheet of each kind of paper and cut it vertically (the narrowest way) into strips, one inch wide, and place them in the appropriate test slip boxes. Keep the cover on each box, and keep each package of paper in its envelope, or at least, keep the black wrapping-paper in which the paper comes, completely folded when not being handled. I find it a time-saver when printing a dozen or more pictures on one kind of paper, to remove the wrapper and place the sheets in a box having a cover loose enough to lift off easily. Unfolding and refolding the package a dozen or more times while printing is a nuisance.

Print from the pile of thin negatives, first, using the Hard X, or contrasty paper.

Place the sensitized side of the test slip against the film or rough side of the negative so that it covers the most important part of the picture. The paper curls slightly, the sensitive side being slightly concave. An absolute test is to bite the corner of the sheet; the sensitive side adheres to the teeth.

Some sort of platform of boxes or books should be built up near the light so that when the printing frame is placed on it, it will be on a level with the light and at the proper distance away.

To prove that the light is evenly diffused at the point selected for exposure, take a piece of white cardboard, the size of the negative, and move its position with reference to the light, until you find the shortest distance at which an even illumination is secured.

Be sure that the clear piece of glass is clean, if you are using films, or if using glass negatives, see that the backs of them are clean. To clean them, rub them with a wad of moistened cotton, then wipe dry. Don't rub the back of a film with anything moist, as it is gelatinized.

Make the exposure, using good judgment as to the time to give—say, 15 to 40 seconds for contrast paper on a thin negative, with an ordinary electric light, or large oil lamp. Develop, and if not satisfactory, try another slip, varying the time as indicated by the first slip. When the desired effect is secured, any number of prints can be made from the same negative, and if the time of exposure, the distance from the light, as well as the time of developing, are identical, all the prints should be equally good. By comparing the density of other negatives with the one that has been tested, it will be possible to make a fairly accurate estimate of the time of exposure required by any negative.

4. Developing the Picture

In placing the dry print in the developer, place it face up, immersing it completely very quickly and evenly. The Hard X paper should be developed to the proper depth in from 15 to 20 seconds; and the Soft paper, in about 30 seconds. As soon as the image has reached the desired depth, remove it from the developer, rinse it for a moment in the proper tray by turning it over several times, then place it in the fixing bath. Keep it moving for a few seconds by means of the paddle, so as to give even and thorough fixing, and to prevent stains and other troubles. Leave it in this solution until thoroughly fixed; this will take about 15 minutes.

A very important point to remember when developing, is this:—To get the best tone possible, your exposure must be accurate, and whenever you are forced to yank a print out of the developer in order to prevent its becoming too dark you may be sure that it was over-printed; and whenever you have to leave a print in the developer longer than the stipulated twenty seconds, all other conditions such as temperature, fresh developer, and contrasty paper, considered, you may be sure that it was under-exposed (under-printed). *Practice with your test slips until you are positive that you have hit the correct exposure, even though you have to use up several sheets in doing so.*

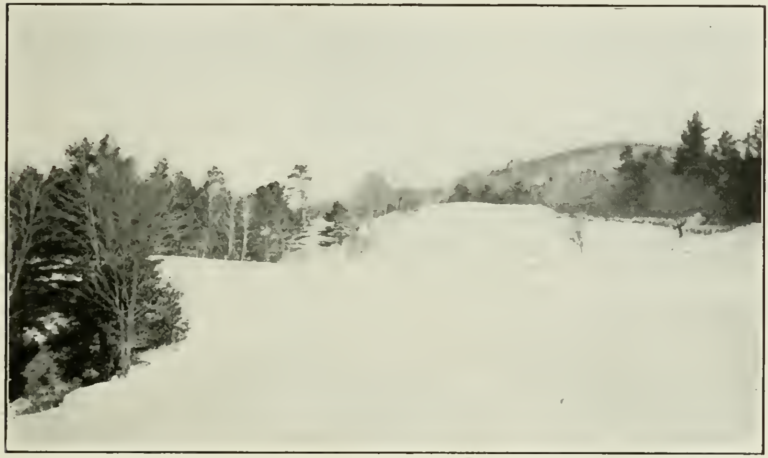

Fig. 64
Undertimed Print From a Normal Negative

When you have printed from all of your first pile of negatives, print your second pile, using the "soft" paper. You will find that this kind prints considerably faster than the other, due allowance being made for the difference in negative density. In fact, it requires but one-half, or less exposure, 10 to 40 seconds being all that is usually needed.

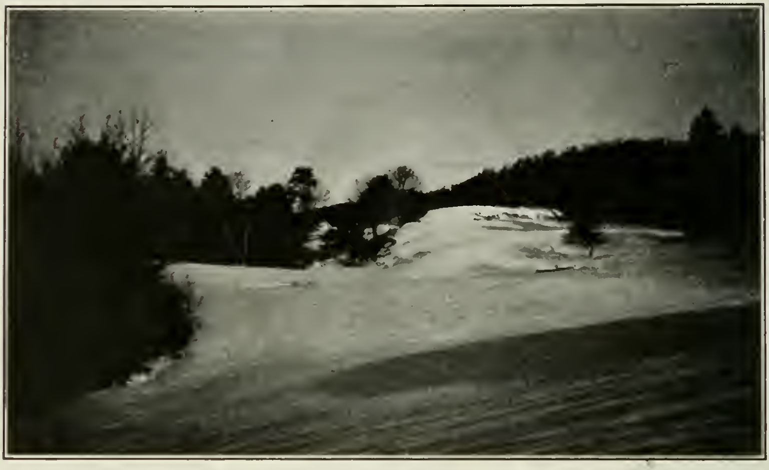

Fig. 65
Overtimed Print From a Normal Negative

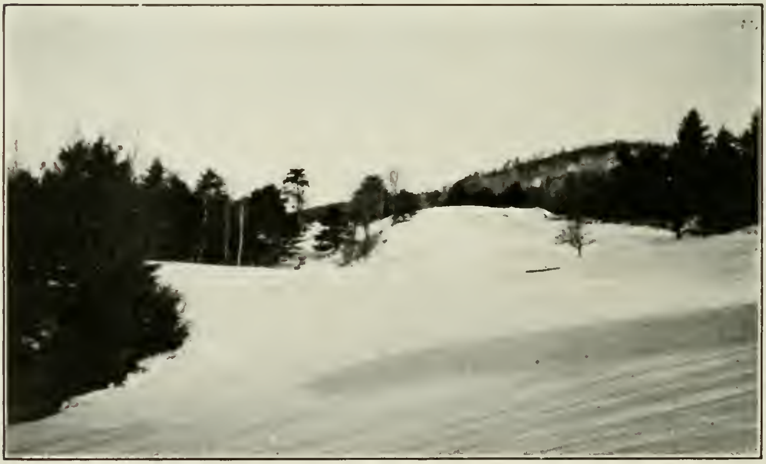

Fig. 66
The Old Coasting Place—Correctly timed print. By *W. R. French*

Judging Results:—If you have correctly judged your negatives as to the class in which each belongs, you will find that the thin, flat group will produce with contrasty paper, prints possessing snap and detail. The shadows may be black in several of them, but only in those instances where the negatives are thin from under-exposure, or under-development, and the shadows possess little or no detail. You would find that prints made from such negatives, on "soft" paper, would be very uninteresting. The tones would be "muddy," and there would be no contrast at all, and consequently no "snap."

If the negatives on which you use soft paper are correctly selected, i. e., are contrasty and even harsh from over-development, your prints will possess snap and detail, and the tones will be even more pleasing than those on the Hard X (contrasty paper).

Naturally, some of your negatives will be "impossible." In this class you will find the fogged negatives; also the extremely over-developed in which the high-lights (blacks) are of inky hue, and the shadows (light parts) are yellowish.

Your dense negatives may bother you a bit until you have had considerable experience, but further on I will elaborate more in detail on the science of judging negatives, and the paper that fits the more obstinate kind.

It would be well for you to try both kinds of paper on negatives that might belong in either class. It is good practice, and besides, one of the prints would surely be satisfactory.

To Secure White Margins

So-called masks can be bought or made, which, when placed between the paper and the negative, enables you to secure a white border around the print as it develops. The Velox and Cyko booklets on Printing Papers, obtainable, free of charge, from the Eastman Kodak Co. and the Ansco Camera Co., respectively, contain very helpful information on how to secure "toned borders" by double printing.

5. Fixing the Picture

Hypo can be obtained for use in either granulated or crystal form. Its purpose is to dissolve the silver salts which have not been acted upon by light. The importance of this chemical is evident, but it is probable that no part or process of photography is more abused than that of correctly preparing a fixing bath and properly fixing prints. To secure permanency, prints must be fixed in a fresh, acid fixing bath. When hypo is first dissolved in water, the temperature of the solution is materially reduced. It is important that the temperature of a fixing bath should be maintained as near to 50 degrees as possible. Probably more prints change color from insufficient fixing than from lack of washing, so these points should be given attention. Have plenty of solution strong enough to thoroughly fix prints in at least 15 minutes. Always use the Acid Hardener in the bath, as it will overcome the tendency of the fixing bath to cause blisters and stains, and move the prints about for the first few seconds after immersion to stop the action of the developer at once over the entire surface of the print. Note:—Never use a fixing bath for paper that has been used for the fixing of films or plates.

Prints can be fixed in a plain hypo bath, consisting of one ounce of hypo to four ounces of water, but there is always a risk of getting blisters, or stains, especially in hot weather. The Acid bath contains a hardening solution which insures the film surface against softening and other troubles. See Chapter 15 for such a formula, if you are to mix your own solutions.

You can fix a large number of prints at one time provided you keep them well separated by moving them around every few minutes with the print paddle when first placed in the hypo. If you don't happen to possess such a necessary device, you can make a substitute by winding around the end of a long, clean stick, a clean, white rag, thus making a sort of swab.

6. Washing the Picture

If you would have your prints retain their tones permanently, you must not only fix them thoroughly, but you must also wash them until every "whit" of hypo is eliminated. Now, as it is impossible to tell when the hypo is entirely washed out of the film by looking at it, the best method to follow is to go by the instructions of those experts who have specialized on the chemical phases of photography, and, as a result of their experiments have given us printed helps which are correct to the letter.

It stands to reason that prints which are allowed to mat together in a washing receptacle will not be thoroughly washed, even though they remain in the water for an indefinite length of time. No—they must be separated time and again to allow the water to reach every atom of surface, and the best arrangement for accomplishing this end, without handling the prints over several times, one at a time, is to use a box or other washing device into which the water enters from the bottom either by means of a pipe connection, or by having a hose long enough to reach from the faucet to the bottom of the wash-box, or basin, or tank. If the water can be made to enter at the bottom, such a current is created that the prints will be kept in constant motion and will wash in from one-half to three-quarters of an hour.

If running water so arranged is not used, be sure to pass the prints, one at a time, through eight to a dozen changes of water, from one dish to another.

When running water is used, the stream should not be allowed to run directly on to the prints with force, as it may cause breaks in the fibre of the paper, producing blisters. Place a tumbler or graduate in the washing tray, and allow the water to run into it and overflow into the tray.

There is a test for determining when the print is free from hypo, if you desire to use it: Make up a solution as follows:

Permanganate of Potassium	8 grains
Caustic Soda	7 grains
Water, distilled	8 ounces

Fill a glass with pure water to which add four drops of this solution. Then allow the water to drip into it from a print or two. If hypo is present, the violet color of the water in the glass will change to a slight greenish tint in from five to seven minutes.

7. Drying the Picture

After washing the prints as directed, remove from the wash water, drain well, and lay them face up on clean lintless blotters, care being taken to blot off surplus moisture. If a large number of prints are to be dried, place them on a clean glass in a pile, face down. Cover them with a blotter or towel, and with a squeegee roller press out all surplus water. Then lay them out separately, face down, on cheesecloth stretchers, which can be constructed by making a framework of light wood and tacking bleached cheesecloth tightly over it.

Prints dried in this manner will curl but slightly. If, after being dried, they have a slight tendency to curl, they can be made to lie flat by placing them face down on some smooth surface and then drawing a ruler over the back of the print with a slight pressure, lifting the print as the ruler passes over it. When this is being done, care should be taken not to bend any portion of the print too sharply, as by so doing the gelatin surface of the print might crack. Or, they may be placed face down, the backs sponged with water, after which they are put under pressure between cardboard sheets or blotters.

Still another method is to place them face down between long rolls of blotters and then roll up the whole strips. When they are dried in this manner they will have a convex bend which will be very advantageous in keeping them from curling.

8. Adding Lustre to Glossy Prints

Glossy prints can be given a highly polished surface by squeegeeing them. Take the prints from the wash water and place them face down on a ferrotype tin. With the roller squeegee them into absolute contact and allow them to become bone-dry before attempting to remove them from the tins, when they will then peel off with the desired lustre. If the tin has been in use for some time, a portion of the print may stick. To prevent this prepare the tins as follows:—

9. Cleaning Ferrotype (Squeegee) Tins

Dissolve 10 grains of beeswax in one ounce of Benzine. Allow this to stand for a few hours, in which time a precipitate will be formed. The clear solution thus obtained should be used for polishing the tin, being applied to the surface of the tin with a soft canton flannel cloth. When the surface of the tin has been thoroughly covered with this preparation, the tin should be polished with a piece of dry canton flannel to remove as much of the beeswax as possible. Cleaning the tins with wood-alcohol will also prevent sticking.

MORE ABOUT PRINTING—ADVANCED

To this point I have given you the principles of preparing the picture for the album, or mount, without elaborating on the different grades and surfaces of paper and their relations to different kinds of negatives. In telling you how to make a picture from the negative I left out this more difficult phase of the process, because it is far more important for you to learn how to make perfect prints from one or two kinds of negatives with one or two "degrees of contrast" paper of the same make, than to become tangled up at the start with the "whys" and "hows" of more scientific printing.

If you are sure that you are ready for more of the science of printing, study these paragraphs on "more about printing" very carefully, BUT, *don't try to digest the whole thing at one sitting!* Be satisfied with the general principles, and yet, don't give up until you can tell at a glance in what class to place any negative which you may pick out of a lot, and what contrast of paper will best fit it.

It is time well spent to sit down occasionally with a batch of negatives for the sole purpose of classifying them under "over-exposures," "under-exposures," "under-exposures correctly developed," "under-exposures overdeveloped," "over-exposures correctly developed," "over-exposures overdeveloped, and underdeveloped," "correct exposures correctly developed," "correct exposures overdeveloped, and underdeveloped," etc. In making such a study, you will find the information and illustrations in Chapter V very helpful.

Success in securing pleasing prints from all kinds of negatives that are at least half-way decent depends on four factors:

1. An understanding of the various grades, surfaces, and degrees of contrast of the paper which you are to use.
2. Ability to classify the negatives according to the kinds mentioned a few paragraphs back.
3. Ability to fit the paper to the negative.
4. A certain amount of knowledge regarding

developers in general, in order to be able to judge as to whether your's is working properly.

I will run over the fundamentals of factor number one:—

Factor 1—Grades, Surfaces, Degrees of Contrast (printing quality)

GRADE is a term used by most manufacturers of photographic papers to specify a "brand." For instance, Velox is made in six different grades—Velvet, Portrait, Carbon, Rough, Glossy, and Royal. Cyko is made in four grades:—Blue Label, Yellow Label, Red Label, and Green Label (enlarging). Azo is made in four grades also designated by the term, "label."

You need not bother at all over trying to remember what the term "grade" has to do with fitting the paper to the negative, except as it indicates whether the paper is "buff" in color, or whether it is white.

SURFACE is a term which distinguishes one surface from another, such as Carbon, Rough, Matte, Semi-matte, Glossy, Smooth, etc. There is no set rule as to what surface to use, but in general, small prints show up best on smooth or glossy paper; and large prints are usually at their best on rough paper.

Landscapes are more attractive on buff paper—the choice of smooth, matte, or rough being about equally divided.

Prints for reproduction are best made on glossy paper.

DEGREE OF CONTRAST is a term applied to that quality in a paper which determines whether a print made from a correctly exposed and correctly developed negative will possess contrasty, normal, or soft tones. Tones vary in intensity from jet black down through the various shades of grey to snow white.

A contrasty print is one in which the shadows are very dark and practically devoid of detail, and in which the highlights are white and also devoid of detail.

A normal print is one in which there is enough contrast to make it pleasing, and with detail in the shadows and highlights.

A soft print is one in which the maximum of detail which exists in the negative is brought out in the print.

Velox papers, instead of being referred to as contrasty, normal, and soft, are designated as "contrast," "regular," and "special," Cyko is listed as "contrast," "normal," and "soft." Azo has four degrees of contrast—"hard x" (contrasty), "hard medium" (medium contrast), "hard" (normal), and "soft" (soft or minimum contrast).

Grades and Surfaces do not indicate the contrast of the paper. In fact the same surface in some makes is made in three and even four degrees of contrast.

Factor 2—Classifying Your Negatives

No matter how familiar with these terms you become, your pictures will not be the best that you can make until you become skillful in the art of determining whether a negative is over-exposed, or over-developed and so on.

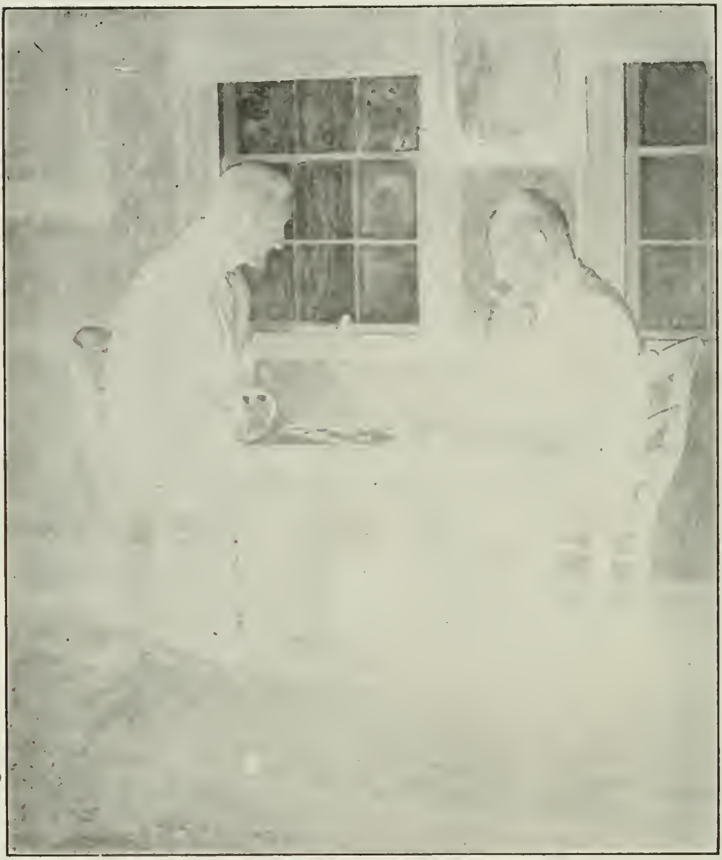

Fig. 67

Illustration of a Thin, Weak Negative—Such negatives require what is known as "hard" (contrast producing) papers. Soft papers would produce weak, flat prints

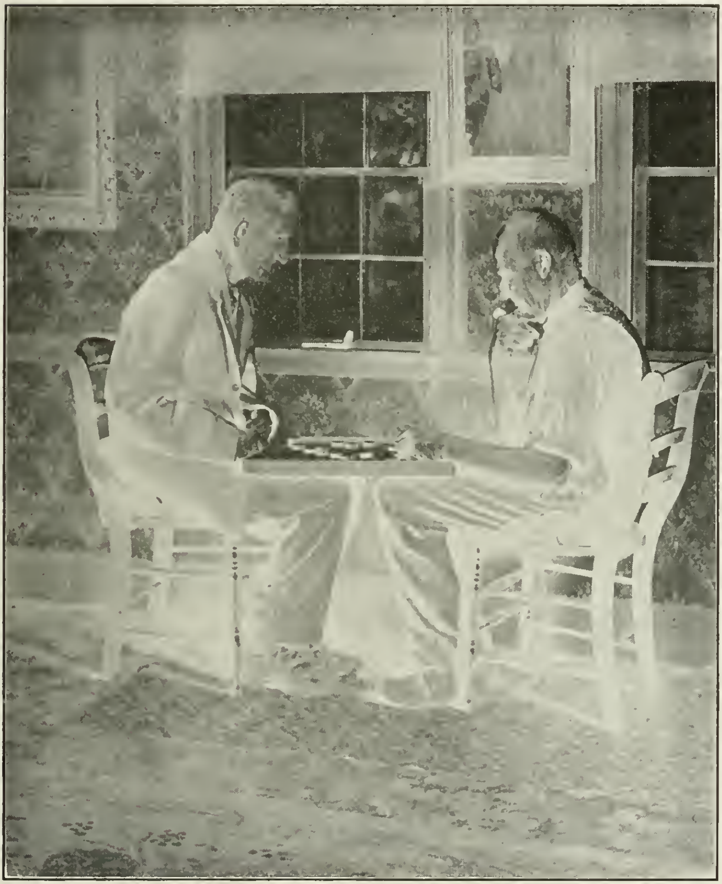

Fig. 68
Illustration of a Strong Negative—Such negatives require what is known as "soft papers," otherwise the prints therefrom would be too contrasty

Factor 3—Fitting the Paper to the Negative

In general there are three classes of negatives to be considered—

1. Thin and Flat.
2. Contrasty, and Harsh.
3. Normal.

To secure a good print from Negative No. 1, you must use a contrasty paper, for its contrasty qualities serve to counteract the flat qualities of the negative, with the result that the two extremes balance each other, and normal tones result.

Understand that a flat negative can be either thin or dense. The thinness is due to either under-exposure or to under-development. If it was over-exposed and somewhat under-developed, a dense but flat negative would result. This negative may need contrast paper for the best results. Flatness can also be due to a lack of contrast in the subject that the negative represents.

When a flat negative is so thin that its densest parts are almost transparent, it was either seriously under-exposed or considerably under-developed, or it may have been both under-exposed and under-developed. If it lacks detail in the middle tones, that is, the tones that should be recorded lighter than the shadows but darker than the highlights, it was under-exposed, while if it contains plenty of detail in all of the tones, but lacks density, it was under-developed. A flat negative that is extremely dense was considerably over-exposed and fully developed.

If a negative that was correctly exposed and correctly developed is flat it is because there was insufficient contrast in the light reflected by the subject.

Whatever may be the cause of lack of contrast in a negative, a print that has ample contrast can usually be made from it on contrasty paper, provided a clearly defined image can be seen when the negative is held up to the light and examined by the daylight that passes through it.

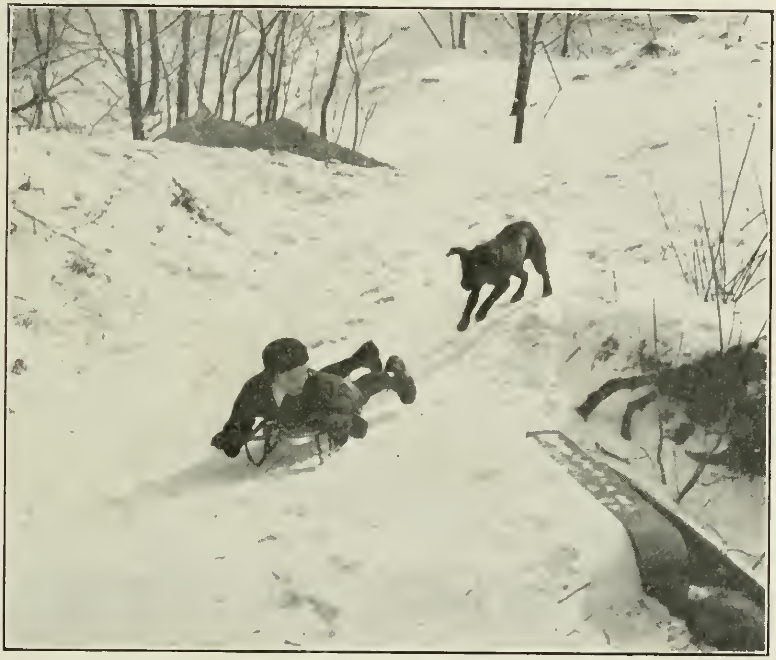

Fig. 69

Speed Rivals—A "snappy" picture as a result of using hard paper on a thin negative

The reason why contrast paper will yield a good print from such a negative, when other grades of paper will not, is because contrast paper is especially made for recording much more contrast than the negative contains.

To secure a good print from Negative No. 2, a contrasty or harsh negative, a soft paper will be needed in order to properly balance up the tones. If the negative is extremely over-developed, it will be impossible to secure a good print, even with the softest kind of paper.

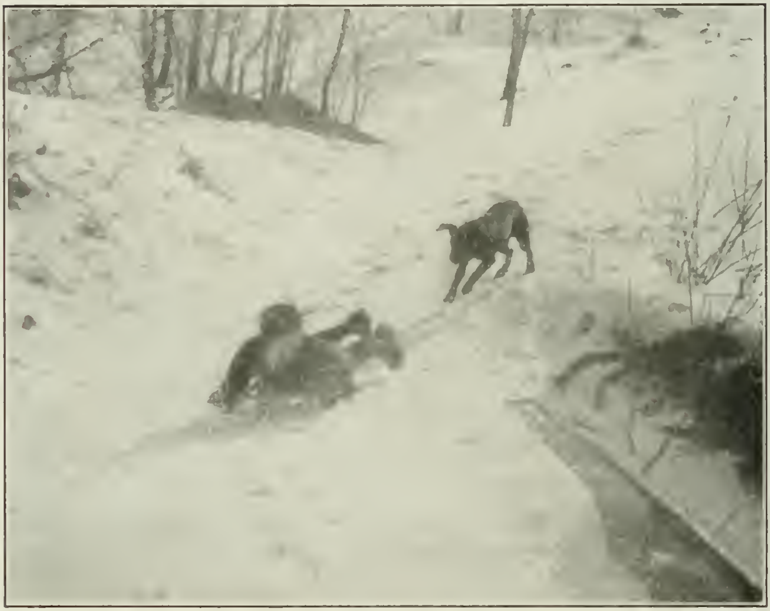

Fig. 70

The result of using soft paper on the same thin negative as that from which Fig. 69 was made—Picture is "weak" and "flat"

Soft paper is one-third faster in printing than contrast paper, but develops more slowly.

To secure a good print from Negative No. 3, a normal negative, a normal paper is best, although almost any contrast of paper will produce a good print from a good negative.

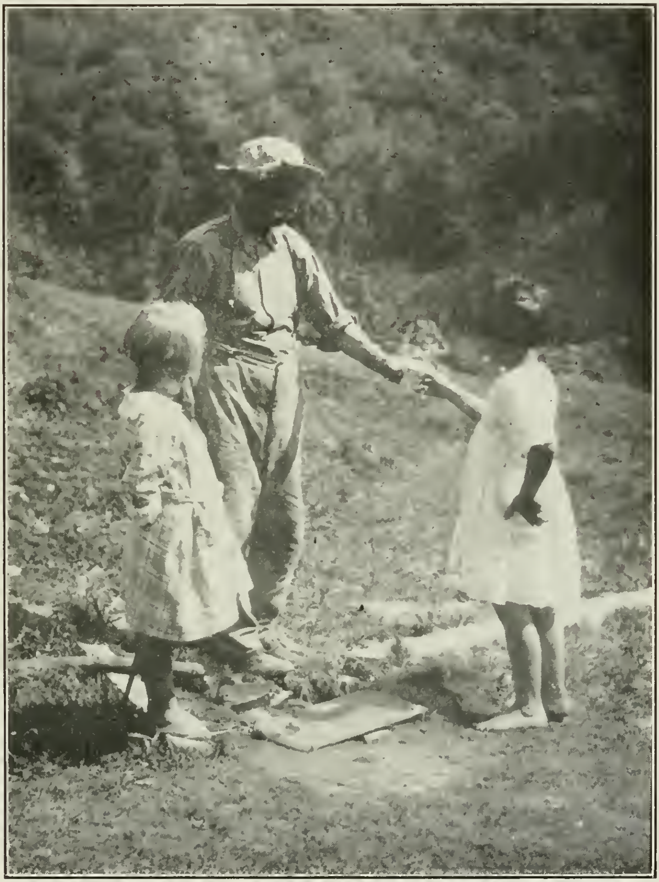

Fig. 71

A "Harsh," "Contrasty" Picture—The result of using "hard" paper on a strong negative

It is a simple matter to determine whether you have chosen the contrast of paper best suited to any particular negative, provided you have correctly printed and

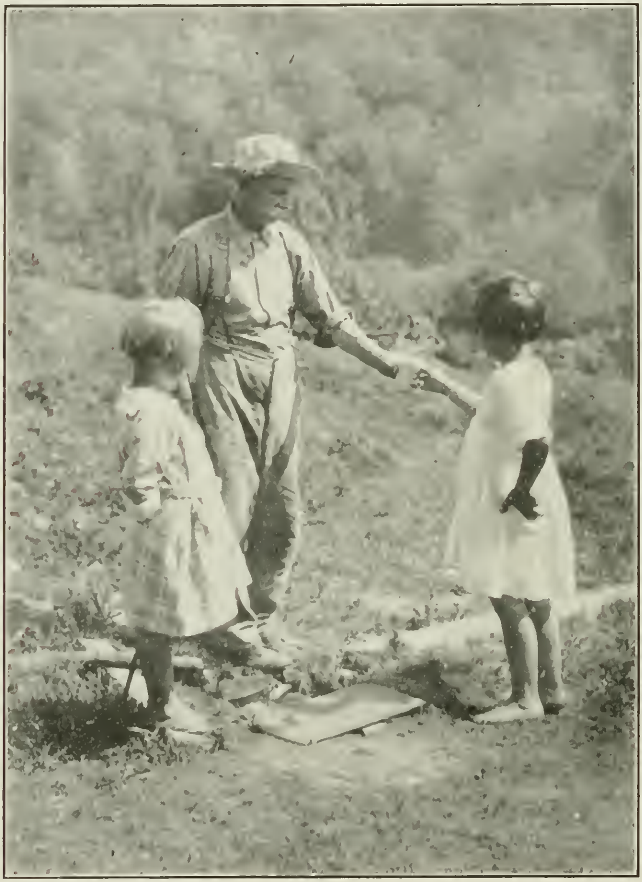

Fig. 72
A Kind Grandpa—A much softer and more pleasing print as a result of using a "soft" paper on a strong negative.

developed the print. If your negative has detail in the shadows, and your properly printed and developed picture shows no such detail, you will know that your paper was too contrasty. If your picture from such a negative shows plenty of detail but lacks "snap," or "brilliancy," you will know that the paper selected was too soft.

You must do a lot of experimenting in this way before you can feel sure that you are getting the best pictures that your negatives will permit.

From what I have written, it will be seen that the print must be correctly exposed and correctly developed, else it will be either too light or too dark. Fortunately, we can do both of these things with certainty if we are persistent and careful.

In printing there are four facts to consider:—1. The length of time in which the paper is exposed to the illuminant. 2. The distance at which the negative is placed from the light. 3. The temperature of the developer. 4. The length of time during which the print is developed.

By keeping the developer at a fixed temperature (70 degrees is best), developing each print of one degree of contrast for the same length of time, and by always placing the negative at the same distance from the light, three of these factors become known quantities. By adhering to these three known quantities it becomes easy to find the one remaining unknown quantity. We do this by exposing and developing a print, and by repeating this process until we get what we know to be a print properly exposed, and properly developed.

Since all the factors have now become known, we can, by adhering to them, make any number of prints from the same negative that will be exact duplicates of each other.

The illustrations given here show the results obtained by printing for different lengths of time, with the printing frame at the same distance from the illuminant in each case. Each print was developed for the same length of time, with the temperature of the developer at 70 degrees. A comparison of Figures 64, 65 and 66 shows that a badly under-printed print is weak and lacking in detail, while a badly over-printed print is too dark and also lacking in detail.

It is just as easy to print for the right length of time as for the wrong length of time, and a correctly printed print always more faithfully represents the subject.

Factor 4—A Knowledge of Developers

The ingredients which go to make up developers for papers are the same as for plates or films with the exception of Pyro and possibly one or two other developing agents. Moreover, the principles governing the two developing processes are the same. The one ingredient which the beginner should understand and know how to use is Potassium Bromide, for the tone of the print depends on the manner in which this particular constituent is used, or regulated. If a few drops too much are added, rich black tones are out of the question, and the more you add, the more olive the tones become. If too little is used foggy prints will result.

Of course all prepared developers such as tube developers and concentrated solution developers contain the correct amount of Bromide, provided the paper is used for which the special developer is recommended. It is when one is mixing his own solutions that care must be used.

In any case, however, it is always well to have a 10% solution of Potassium Bromide on hand when developing, for sometimes the paper may be so old that it tends to fog easily, under which conditions a drop or two of the "restrainer" may save the day.

It is also well to know that a diluted developer tends to even up the tones, thus producing the maximum of detail; while a strong developer produces more contrast.

Excess of Carbonate produces contrast, while a less amount than that stated in the formula tends to produce flat tones.

Mix Chemicals According to the Order Given

The chemicals used in the developer should be dissolved in the order given in the formula.

Sulphite of Soda is a preservative and prevents the developer from decomposing rapidly and becoming discolored.

Carbonate of Soda increases the affinity of the agent for oxygen, and also serves the purpose of opening the sacs of gelatine wherein lie the particles of silver which are to be acted upon. This action is slow or rapid in proportion to the amount and quality of the alkaïi used.

Bromide of Potash (potassium) is used to keep the whites clear, and is also important in controlling tone, as stated heretofore.

Developer mixed according to formula cannot be improved upon in the general run of work.

In nearly every standard developer there are two developing agents, the constant one of which is Hydrochinon. Increasing the amount of the one and reducing the amount of Hydrochinon will produce softer results. Increasing the amount of Hydrochinon and reducing the amount of the other agent will increase the brilliancy or contrast of the prints to a certain extent.

Increasing the Carbonate will cause the developer to work more vigorously, and also tend to produce black tones without olive. Reducing the Carbonate will cause the developer to work slower and will produce softer results.

To produce more contrast in prints, the Hydrochinon should be increased, also the Carbonate, and this will tend to make the developer work more rapidly; the Bromide should be increased to give greater control of the development of the print.

To produce less contrast in prints, use double the amount of the one agent, and half the amount of Hydrochinon, and half the amount of Carbonate called for in the regular formula.

If the developer discolors rapidly when being used, it will indicate weak or old Sulphite of Soda, which is the preservative. Use fresh sulphite of the best quality.

Enough Bromide should be used to keep the prints from fogging in the developer. If only enough to do this is used, the tone of the prints will be cold or blue-black. A slight increase will give a better black. With further increase comes the more desirable warm or olive-black tone.

Following are the effects produced by different exposures, using the same developer throughout:

Extreme under-exposure and forced development will cause prints to be flat and weak, cold or blue in tone, and lacking detail in the highlights. The whites in a forced print are also apt to be grayish or discolored and stained.

Slight under-exposure will produce prints of fairly good quality, but cold in tone.

Slight over-exposure will slightly increase the contrast in the print. This rule can be used to advantage on negatives that lack snap or brilliancy. For this same reason, slight over-exposures should be avoided when printing from harsh negatives.

Extreme over-exposure will cause prints to develop rapidly and to be flat and "muddy" in general appearance.

In extremely cold weather the developer will work slowly. Do not use ice cold developer!

In warm weather, the developer is apt to act rapidly and with too much vigor or contrast. If it is not convenient to keep the developer cool, it will be advisable to use one-half the amount of Carbonate called for in the formula.

You now have just about enough "dope" on this subject to enable you to manipulate your developer so as to secure definite results—too much fussing, however, will lead to unsatisfactory results. Don't try experiments until you are able to turn out good work by sticking to the instructions that go with whatever papers you use regularly. The data given in Chapter Nine, Beginner's Troubles, Series 2, will be found very helpful in determining the difficulties that you will meet before you can produce faultless pictures regularly, as far as the merits of your negatives will permit.

The ideal tone to aim for is a brown black. You can secure this color if you will use the formula recommended for the paper or by using the prepared developers which are made especially for the paper.

The tone can be made just as warm a black (olive) as you desire by adding more of a 10% solution of Potassium Bromide—the more you add the more olive the tone.

PRINTING IN CLOUDS

Occasionally you will find among your landscape pictures one that would be greatly enhanced by the addition of clouds. The so-called bald-headed skies that are so common among amateurs' pictures are not, in good part, true to nature, therefore it is well to know how to improve such pictures by printing in clouds from cloud negatives.

In order to prepare yourself for such emergencies, you should obtain several negatives of clouds only. In making such negatives, work along the following lines:—

1. Make one or two cloud negatives with the sun at your right; one or two with the sun at your left; a like number with the sun at your rear; and one or so with the sun in front. You will then have a negative or two

representing all principal positions of the sun with respect to the camera position. Then, when printing in clouds, you can select that cloud negative in which the clouds were lighted by the sun from approximately the same angle as the view itself.

It stands to reason that you shouldn't print clouds that were taken when the sun was at your left into a picture that was taken when the sun was at your right.

2. In exposing for cloud negatives, make short exposures, so that your negatives will be thin, for if you over-expose, you will destroy the delicate contrasts that exist between the highlights and the shadows, and thereby flatten the negative.

Your exposure should be about 1/50 second at stop U. S. 32 or F22 for a rather heavy sky, or with the sun at your side towards the front; and 1/100 with the same stop, when the sun is behind you, and thus illuminating the sky evenly in front.

If you use a sky filter, use stop U. S. 16 (F16) with the respective exposures as given.

3. In developing, STOP, the moment that full detail appears.

4. Be sure that a portion of the landscape is included in your cloud negatives, say ¼ the width of your plate. This will enable you to quickly ascertain which is the bottom of the negative, and will also make it possible to use clouds that are truly low-down clouds.

The Method of Printing the Clouds In

Lay the landscape negative, film side down, on a sheet of translucent paper of about the same length, and a trifle wider. Hold the combination against the window pane so that you can discern the outline of the negative through the paper and trace a line across the paper corresponding to the horizon-line. Cut two pieces of cardboard or opaque paper into identically the same shape and size as the two paper masks, made by cutting the translucent paper in two along line just drawn, by laying the mask on cardboard or opaque paper and tracing along the rough edges which correspond to the horizon-line.

Cut these edges so that they will be a trifle saw-toothed, making the notches 1/16 of an inch deep. This is to avoid making a sharp edge when masking.

Now print your landscape negative, at the same time shading the sky with the sky-mask, keeping it constantly in motion during the exposure, both back and forth an eighth of an inch and up and down with the same amount of play. Of course you should first make test slips of both landscape and cloud negatives separately.

Next, remove the landscape negative and place the properly selected cloud negative in the frame. Print the clouds, meanwhile masking the lower part with the mask that was cut to fit the landscape in the landscape negative. This mask must be moved slightly, as in the case of the first printing. If both masks are correctly placed and are kept moving, slightly, while the exposures are being made, and if both exposures are correctly made, you should obtain a picture in which the clouds appear to good advantage, and without a noticeable markation along the horizon-line. This process will require considerable practice, but it can be mastered in a short time.

Don't lay the mask plumb against the negative when printing, but hold it a quarter inch or so away. This will improve the vignetting—the blending of the horizon-line with the sky.

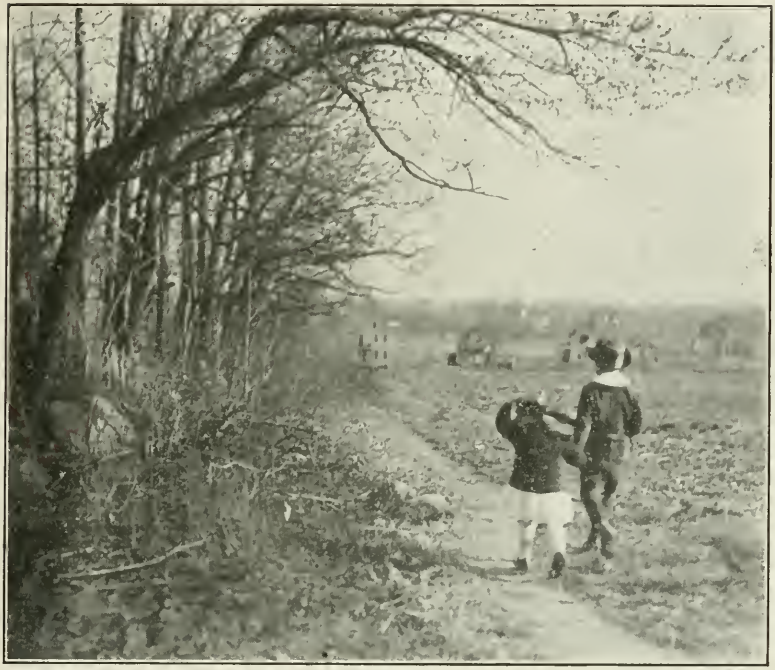

Fig. 73

Out in April Winds—Here is a picture that needs clouds suggestive of wind; there were none in the negative

A similar method can be used for printing out clouds that are already in the negative, but which are so dense that the exposure which is ample for the land portion of the negative is far too brief to affect the printing out of the clouds.

In such instances, one mask only is needed, that is the mask for the lower part of the negative.

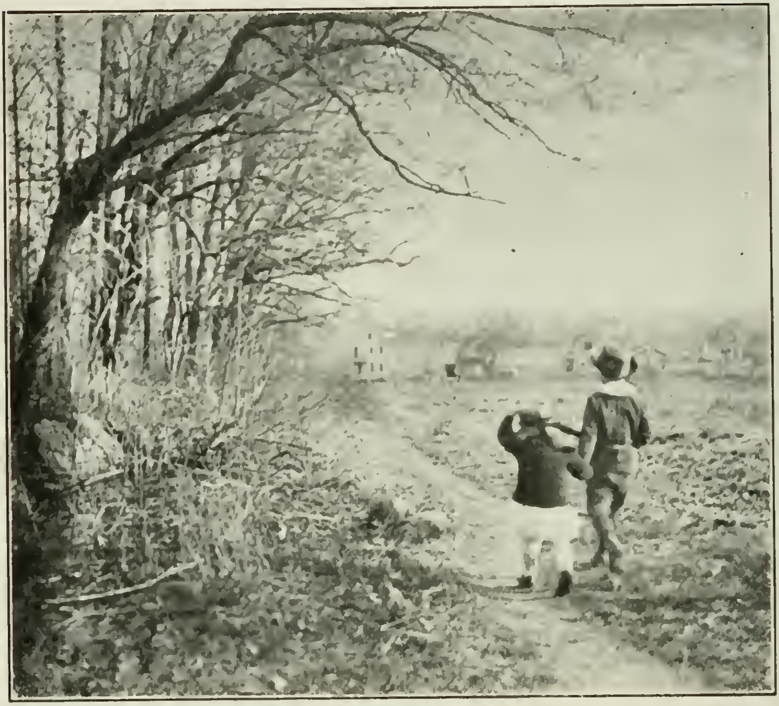

Fig. 74

Here we have the same picture, but greatly improved. The clouds were printed in according to the method described herein

OTHER PRINTING PROCESSES

Several years ago, before such developing-out papers as Velox, Cyko, and Azo reached the acme of popularity, papers requiring sunlight for printing were universally used. I shall not go into detail about such papers, or any of the other kinds that I shall mention under "other printing processes," because, either they are not commonly used now, or they belong in the most advanced class. I will simply outline a few characteristics of the various kinds, as a sort of reference guide for those desiring information in regard to what the different kinds of processes are.

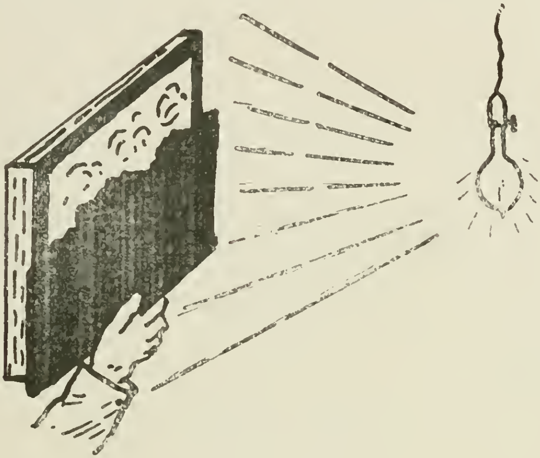

Fig. 75

Illustrating how to mask the landscape while clouds are being printed in

DAYLIGHT PAPERS

Most common among the papers requiring sunlight, at least light of some actinic strength, are:

1. Blue Print Paper.—This paper is used extensively for making copies of architectural drawings. It develops out in water—a very simple process. There

are other makes of papers that tone in water, which you will see advertised in photographic periodicals. I have used practically every kind of paper made, and, with the exception of Platinum and similar brands, speak very strongly for developing out papers in preference to those papers which require straight daylight printing.

2. Platinum, a very expensive, but wonderfully beautiful paper, requires a special kind of toning and fixing bath.

3. Gelatine Printing Out Paper—Proofs which you receive from professional photographers are illustrative of this paper. To finish this paper so that it will not fade, it is placed in a "gold toning and fixing bath," then washed.

4. Bromoil and Carbon processes require considerable experience and artistic skill and are used successfully by only the most expert photographers.

Making Sepia Prints

For securing Sepia tones on "black and white" and "buff" papers there are two common methods.

1. The Hypo-Alum Process

This process is somewhat slow and uncertain for the beginner, but very extensively used by camerists who are good printers. The secret of securing rich sepia tones lies in one's ability to get the right sort of a print to start with. If the print is too blue-black, the resulting sepia will be purplish; if too olive, the sepia will be yellowish. In other words, short exposures and forced development, or too little bromide gives purplish sepias. Too long exposures and quick development, or too little bromide gives yellow sepias.

The correct procedure to follow is to use the developing formula which is recommended for the paper that you are to sepiarize, and to print and develop accurately.

The Formula for the Hypo-Alum Bath:—

Boiling Water (distilled, or rain water)	30 ozs.
Hypo	4 ozs.
When dissolved, add Powdered Alum	1 oz.

Boil this mixture for three minutes, then add Potassium Iodide which has been dissolved in ½ oz. of water—5 grs.

Allow this solution to cool, then add Potassium Bromide,—5 grains, dissolved in ½ oz. of water.

Silver Nitrate—5 grains, dissolved in ½ oz. of water, the two latter ingredients being poured together before being added.

Allow the solution to stand for two hours, when it will be ready to use, after reheating to a temperature of 120 degrees Fahrenheit.

Stir the bath constantly while adding the different chemicals!

The bath can be used repeatedly and as many prints as can be conveniently handled may be placed in it at one time. Prints will tone in this bath in from 20 to 30 minutes.

Prints should be separated occasionally while in the bath in order to insure even toning. Should any print show unevenness in the first stage of toning no harm is done as the toning proceeds to Sepia then stops, making it impossible to over-tone.

Prints should be placed face up in the bath to prevent air-bells from forming on the emulsion. These air-bells cause round black spots.

If desired, the bath can be used after it has been allowed to cool by leaving the prints in it over night. The precaution necessary is to use care in immersing the prints thoroughly and evenly. They should also be stirred occasionally during the first stages of toning in order to insure an even action of the toning bath.

In washing the prints, after removing them from the bath, they should be run through a change of luke warm water and swabbed with a tuft of soft cotton in order to remove any precipitated Alum. In cold water this forms a milky scum, but is easily removed in warm water.

2. Sepias by Re-development

The material for this process can be purchased in tube form, as well as in package and in liquid form. The Velox Redeveloper is best for Azo papers.

A 4-oz. bottle will tone about four hundred 3¼ x 5½ prints or post cards. Full instructions accompany each package, but a few precautions will not be out of place here: Prints must be washed free of all hypo, and should preferably be dried before toning to secure the best results. Too strong a solution, or too long immersion in the solution will cause blisters.

The principal advantage of this method is that it is a much faster one than the Hypo-Alum method.

Red Tones

In the Cyko booklet, previously referred to, you can find instructions for securing red tones on that paper.

Green Tones

The Eastman Kodak Co. manufactures what is termed the Kodak Velvet Green paper, for securing very novel prints of sea and landscapes.

Other Tones

The American Annual of Photography, published by George Murphy, Inc., 57 East Ninth Street, N. Y., contains a very complete assortment of formulas for securing a large range of tones, appropriate for various subjects.

CHAPTER IX

BEGINNERS' TROUBLES—SERIES 2

A CHAPTER ON DEFECTS WHICH ARISE IN PRINTING

MANY are the worries and disappointments which are bound to accompany every beginner's efforts to master the secret of successful printing, especially every beginner who undertakes to dabble in all kinds of developers and with all kinds and makes of papers. As I have tried to emphasize from the beginning, success will come the sooner to you if you will aim at simplicity, by which term I refer to the importance of sticking to one camera; one brand of plate or film; one kind of developer; and one make of paper, until you are able to secure good steady results with them.

Of course my statement infers that your choices of these various pieces of equipment should be judiciously made, for I would not advise sticking to an incorrectly made choice of material. If you will confine your choice of material to that made by one company, including their formulas, your worries will be considerably minimized. However, try as you will, chemical action is a tricky fellow, and will often fool you. But don't give up! Whenever something goes wrong, read and find out where the trouble lies and then aim to rectify it.

Here are some of the most common troubles that will arise in printing:

Impure or Grayish Whites

Due to lack of bromide in the developer. Add a few drops of a 10% solution of potassium bromide.

Also due to under-exposed prints which have been forced in the developer. Or, due possibly to the paper having been fogged by having been brought too near the light while the printing frame was being loaded, or while the paper was developing.

Greenish Tones

Due to too old or weak a developer Or to too much bromide in the developer. Or to oxidized developer i.e., developer which has been weakened by exposure to the air. Or it may be due to over-exposure.

Use a more concentrated developer, or add less bromide. A strong and fresh developer permits the use of more bromide than a weak one, without producing greenish blacks.

Brown Tones

When the brown tones show while the print is in the developer, it may be due to over-exposure and an excessive amount of bromide, or to an old or incorrectly compounded developer.

If the brown tones appear after immersion in the fixing bath, it may be traceable to impure sulphite of sodium, or to too warm a fixing bath.

Contrasty Prints (Lacking in detail)

If your negatives are harsh use a soft grade of paper,

Weak Prints (Lacking in detail)

Due to under-exposure as indicated by the necessity of forcing development.

Flat, Muddy Prints

Due to over-exposure. Or, the negatives are too thin or too weak—Use contrasty, or at least normal paper. In some cases the trouble is due to a too weak developer.

Yellow or Brown Stains

The developer has not covered the prints evenly, or too long a time has elapsed between developing and fixing, or the prints were not kept in motion when first placed in the fixing bath.

Staining all over the print is due to trying the development of under-timed prints, or too weak or too old a developer. Or the print may not have been fixed thoroughly enough or not washed sufficiently. It is easy to determine when the trouble is due to incomplete fixing, because the print will have a sweetish taste just after it is washed.

Always rinse prints before fixing!

Round Dark Spots

Due to air bells on the print while in the fixing bath. The print should be completely immersed in the acid-hypo bath and kept in motion during the first few seconds after immersion.

Blisters

Usually due to a great variation in temperature between the different solutions and the washwater. Or it may be due to a lack of acid in the fixing bath.

Blisters are sometimes caused by allowing the water from the tap to run with force directly on to the prints, —nine times out of ten, however, blisters will be a minus quantity if you will use a fresh acid-hypo bath every time you do any printing.

Impure Chemicals

It is easy to ascertain when the fixing bath is not in proper condition, for by wetting the thumb and forefinger in the fixing bath you can ascertain whether it feels slippery, a sure sign that it is not right. The surface of the paper should not feel slippery after removing it from the bath; if it does, then you will know that it has either become alkaline, or that the chemicals are impure.

Discoloration Around the Edges of the Print

If, of several prints from one package, the centers of the prints are clear but the edges discolored it indicates that the paper has been kept in a place exposed to chemical emanations—such as ammonia vapors, illuminating gas, or gas from a furnace or stove, or fumes from turpentine or sewer gas. The package must be tightly closed when not in use.

Curling and Cracking of the Surface

The paper has become dry. It should not be kept in a dry hot place! The trouble may be overcome by soaking the prints for a few minutes in a bath consisting of one ounce of glycerin and twelve ounces of water, and then drying them without again washing.

Round White Spots

Due to air bubbles remaining on the surfaces of the paper while in the developing solution. They should have been removed with the finger during development.

Then it may have been due to small opaque particles between the paper and the negative when printing.

White deposit all over the surface of the prints is caused by milky hypo bath. If washed thoroughly it can be removed.

Black Surface Marks or Scratches

This occurs mostly with glossy paper, and is the result of pressure or friction before development. These marks can be removed from the dry print by rubbing it with a tuft of cotton dipped in wood-alcohol. Use of Non-Abrasion Developer will prevent the trouble.

CHAPTER X

TRIMMING, MOUNTING, AND MAKING THE ALBUM

Trimming

ONE of the first fallacies to get rid of is that which leads you to think that your finished print must be exactly the same size as the negative from which it is made.

A collection of prints is usually of two kinds:—1. Record Pictures, and 2. Artistic Pictures.

A "record picture" is one that records an event or scene and then some, meaning that you not only see in the picture the object or scene that led you to make the exposure, but also several other objects, or an expanse of foreground, etc., that detracts from the main point of interest.

An artistic picture, is one in which the principal object or point of interest immediately attracts the attention, and from which no other attraction draws the attention.

Record pictures are essential to every one's collection, but at that, there is quite sure to be a considerable portion of each picture which in no manner adds to the general interest of it. This unessential portion should be eliminated by vigorous trimming, just as you would trim a lawn of all uninteresting elements such as tall grass, weeds, etc.

Artistic pictures, or those containing one point of interest, are the kind which I wish to emphasize in particular. They are best produced by practicing simplicity; so, even in taking a picture of some pleasing bit of nature, or some attractive scene, several other matters of detail are necessarily included, the whole "lump can be leavened" by the use of the trimmer.

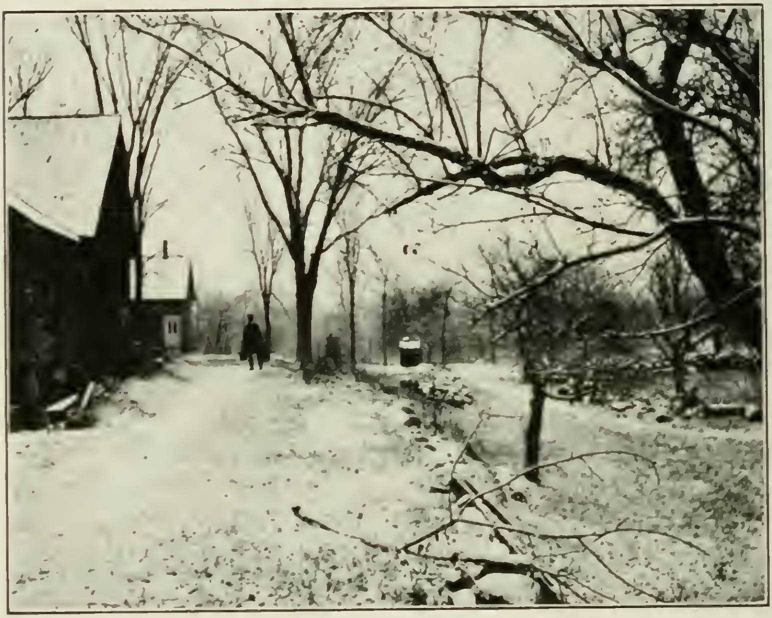

Fig. 76

A picture in which there is an excess of detail—it needs merciless trimming

The two illustrations given here effectively illustrate my point:

Illustration 76 is a "record" picture, pure and simple, and a large part of it is of no use to the picture. Be-

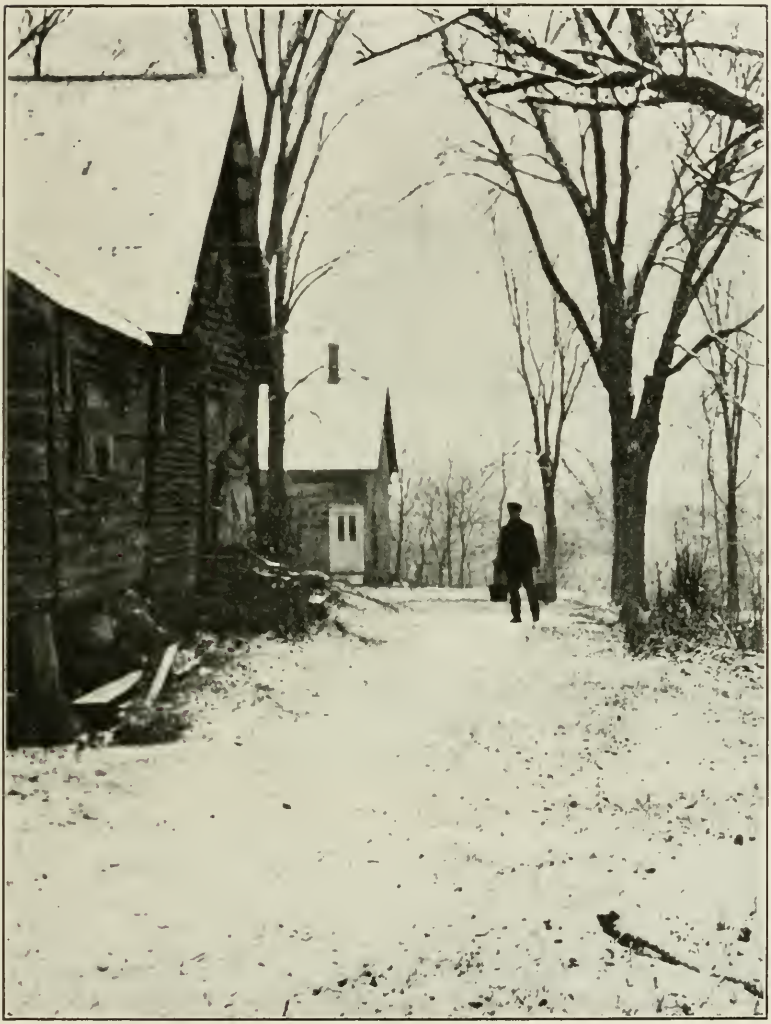

Fig. 77

The First Breath of Winter—Good composition and unity secured by trimming fore mounting it or placing it in the album, at least 1/3 of the right side should be sliced off.

Illustration 77 shows how a real picture was made of this record picture, by trimming the print down to the one main point of interest.

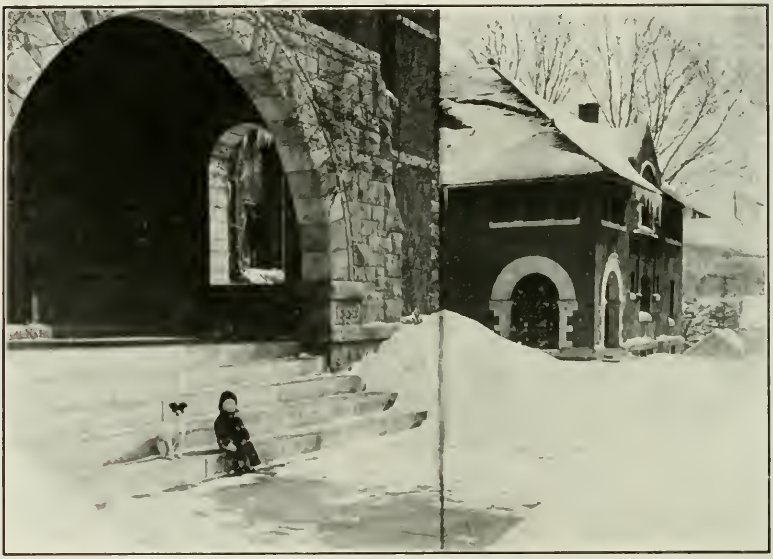

Fig. 78

A Picture with Divided Interest—the figures on the steps, and the building on the right to which the eye is attracted by the snow path. The line drawn determines two pictures of interest. By *Everett Towle.*

"Record Pictures" usually contain several pictures in one; this is true in Illustration 78.

In every case it is for you to decide just how important to the main point of interest all the other elements are, bearing in mind that the spectator is not likely to miss what he doesn't see. You know your attitude when reading a story,—you are very likely to skip hastily over those matters which have no particular bearing on the main trend of the story, but the fact that you have to waste time in determining which is the unessential part of the story, is apt to disturb you if there is too much of it. The same principle is true of your pictures; they will be much more interesting, both to yourself and to others, if the principal point of interest stands out boldly in each picture. Courageously trimming off all non-essential details will stamp your pictures as out of the ordinary, and very interesting to look upon.

Of course if you are using a small camera, one that makes a 2¼ x 3¼ print, the little fellow won't stand a whole lot of trimming, therefore it would be well, after a start, for you to practice cutting out the unessential detail when taking the picture; and besides, in small pictures, extra detail does not matter as much as in the larger ones. When you begin enlarging, your real fun will begin, for you can enlarge only that portion of the negative which best suits your taste.

Mounting

Now-a-days very few camerists care to mount their prints because of the advantages that the album offers. Groups, portraits, and large pictures of the home, which are used for decorations or gifts, offer inducements for mounting, and that's all.

For such purposes commercial mounts can be bought, or cardboard can be obtained in sheets and cut into appropriate sizes.

Commercial mounts usually have attractive borders and need no further treatment. Prints can be fastened to them either with paste or with dry-mounting tissue.

If paste is used, the cardboard should be heavy—at least 4-ply—in order to insure against buckling when the wet print which is stuck to it dries.

Mounting With Paste

After the prints are trimmed, immerse them in a tray of clean water, allowing them to soak long enough to become thoroughly limp. Remove them to a good sized piece of clean glass, placing them in a pile face down. Cover with a piece of clean blotting paper, and with a roller squeegee all the water from the pile. Then with a good bristle paste brush apply a thin, even coating of starch paste.

Raise the print by taking hold of the two opposite corners and turning it over, place in position on the mount. Lay a clean, dry blotter over the print and with the roller press into contact. Any lint or fuzz from the blotter, or any paste on the surface of the print should be immediately removed with a soft sponge or dampened cloth.

Any imperfections in the finished print can be corrected by spotting, using a fine sable brush and spotting color of India ink.

Care should be exercised to select mounts which harmonize with the tone of the print.

Mounting in Folders

Double weight papers can be mounted solid, but are best used for folder effects. A very artistic way of making prints with the Double Weight papers is to use a sheet of paper considerably larger than the negative to be printed from. This will necessitate the use of a larger frame (6½ x 8½ or 8 x 10). Have a piece of clear glass the full size of the frame and fasten your negative to the center of this glass with strips of gum-paper; then cut a mask of opaque paper the full size of your glass and, from the center, cut an opening at least one-quarter of an inch smaller than the size of the negative. Place the mask in the printing frame between the paper and the negative, then print and develop the paper in the usual way. This will give a print with a very wide white margin, and when thoroughly dried and straightened, by using an embossing board, an imprint, or countersunk margin about half an inch around the edges of the print will give a fine etching or engraving effect.

Enclosed in a folder mount made of cover paper of a desirable tone, you will have as artistic a result as can be produced.

Mounting With Tissue

The Kodak Dry Mounting Tissue is dry and not sticky to handle; mounting is accomplished quickly and no time is lost waiting for prints to dry after mounting.

Any size print can be mounted with the tissue, and as it is water-proof there is no possibility of the print becoming stained from any chemical in the mount stock.

To use the tissue, lay a print face down and tack to its back a piece of tissue of the same size, by applying the point of a hot iron to small spots at opposite ends.

Turn the print face up and trim it to the desired size. Place in proper position on the mount; cover the print with a piece of smooth paper, and press the whole surface with a hot flatiron; press, don't rub!

The iron should be just hot enough to siss when touched with a wet finger. If the iron is too hot the tissue will stick to the mount and not to the print; if too cold, the tissue will stick to the print and not to the mount. Remedy—(for each case) lower or raise the temperature of the iron and apply again.

Color of Mounts to Choose

Care should be so exercised that mounts are selected that harmonize with the tone of the print. For Sepia prints any shade of brown may be used, although the lighter tones are more artistic.

For black and white prints any shade of gray, buff or cream color may be used. White mounts are appropriate for any color of print and are used almost exclusively by artistic camerists.

All cardboard for the use of prints 6½ x 8½ or larger should be at least 3-ply in thickness.

A very light gray is appropriate for snow pictures, with a dark shade of gray as in insert.

Multiple Mounting

Multiple mounting is using two or more mounts for the same print. For simplicity's sake, as well as for real refined, artistic work, it is best not to use more than two mounts, and these should be of the same

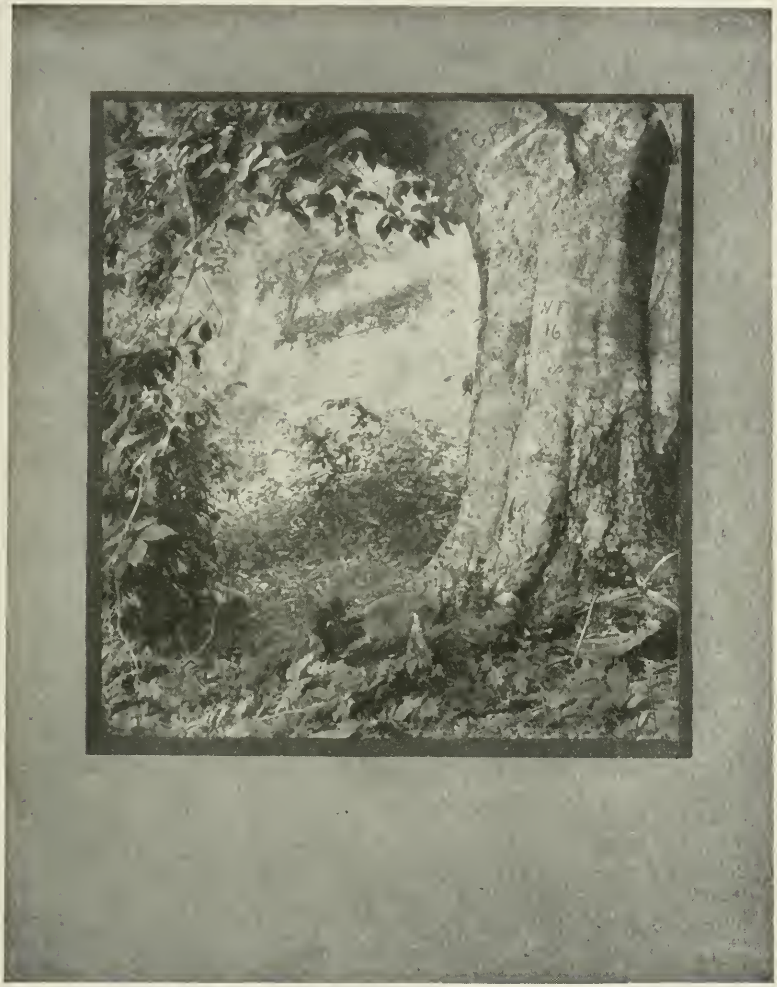

Fig. 79

Guardian of the Tryst—A pleasing form of mounting vertically—narrow margins on three sides color, but differently shaded. I always like to see the inner mount a shade darker than the outer, and forming a very narrow border around the print. For 5 x 7 prints an inner border about ⅛ inch wide is correct.

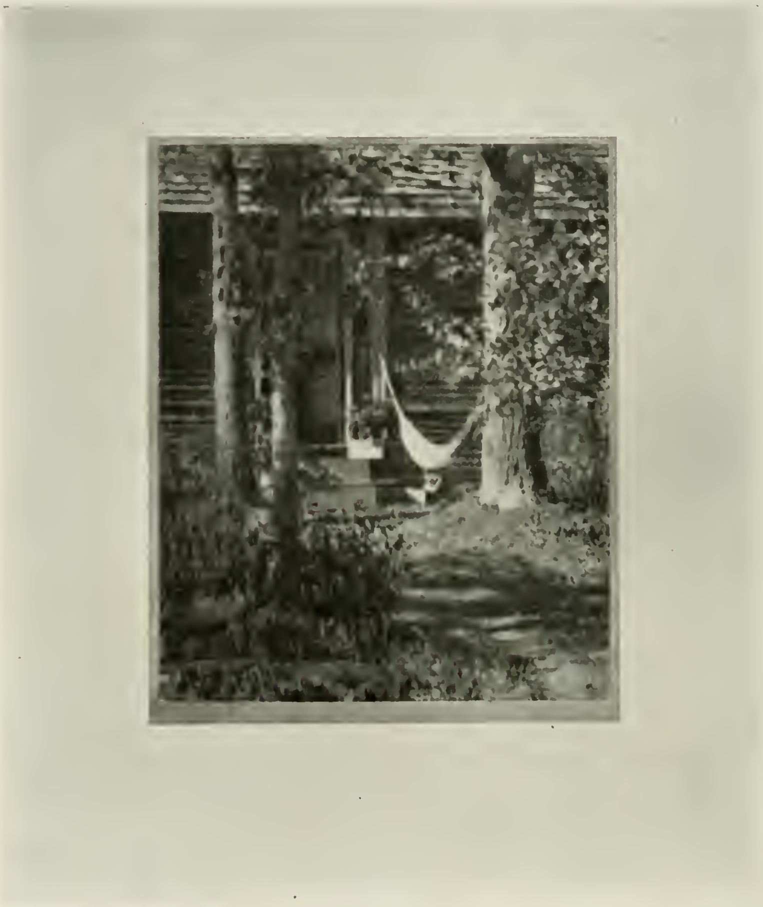

Fig. 80

A Cozy Nook—A popular method of mounting vertical prints

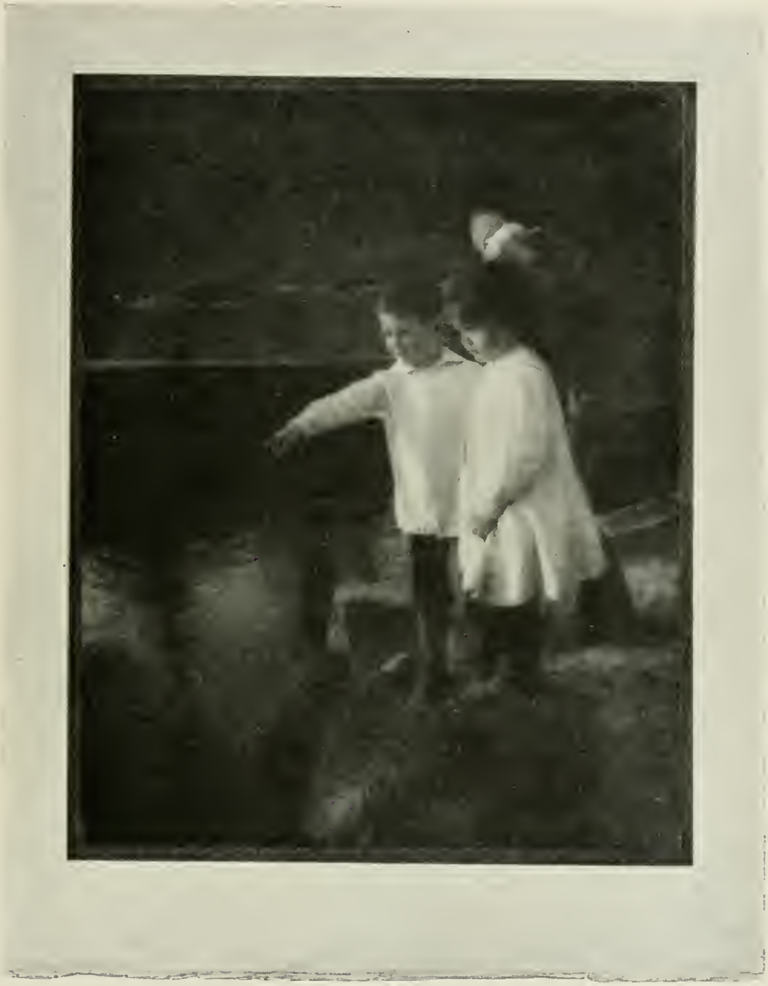

Fig. 81

Some Discovery—A very convenient, economical, and attractive form of mounting for pictures that are to be sent around to competitions, and thus subject to rough usage.

And for an 8 x 10 print, or larger, the inner margin can well be ⅛ to ¼ inch wide with good effects.

As to the size of the mount, the larger the print, the narrower the border may be. It is not a good practice to have the same width of border all the way around the print; it is better to have the top margin narrower than the side or bottom margins.

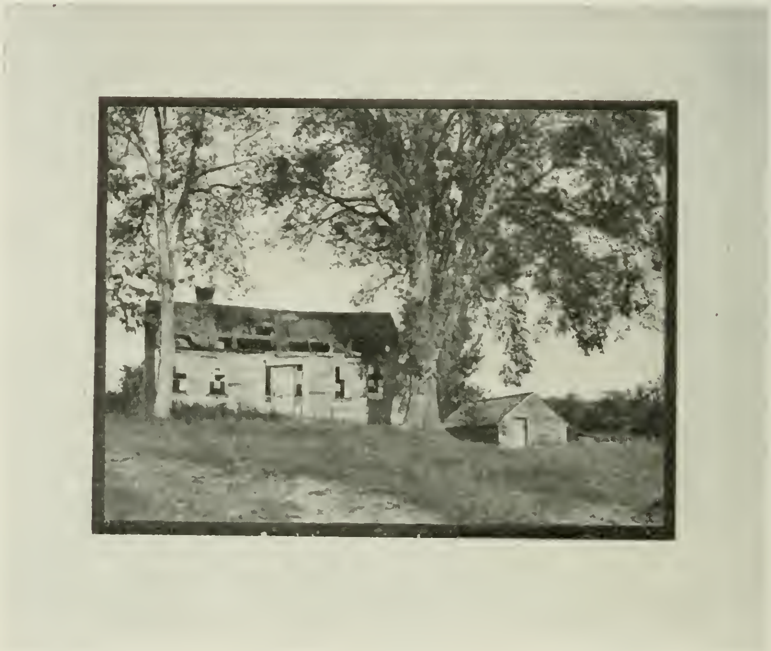

Fig. 82

The Home of Bygone Days—Illustrating mounting methods—the horizontal picture. By *Charles Philbrick*

Here are illustrations of several different styles of multiple mounting:

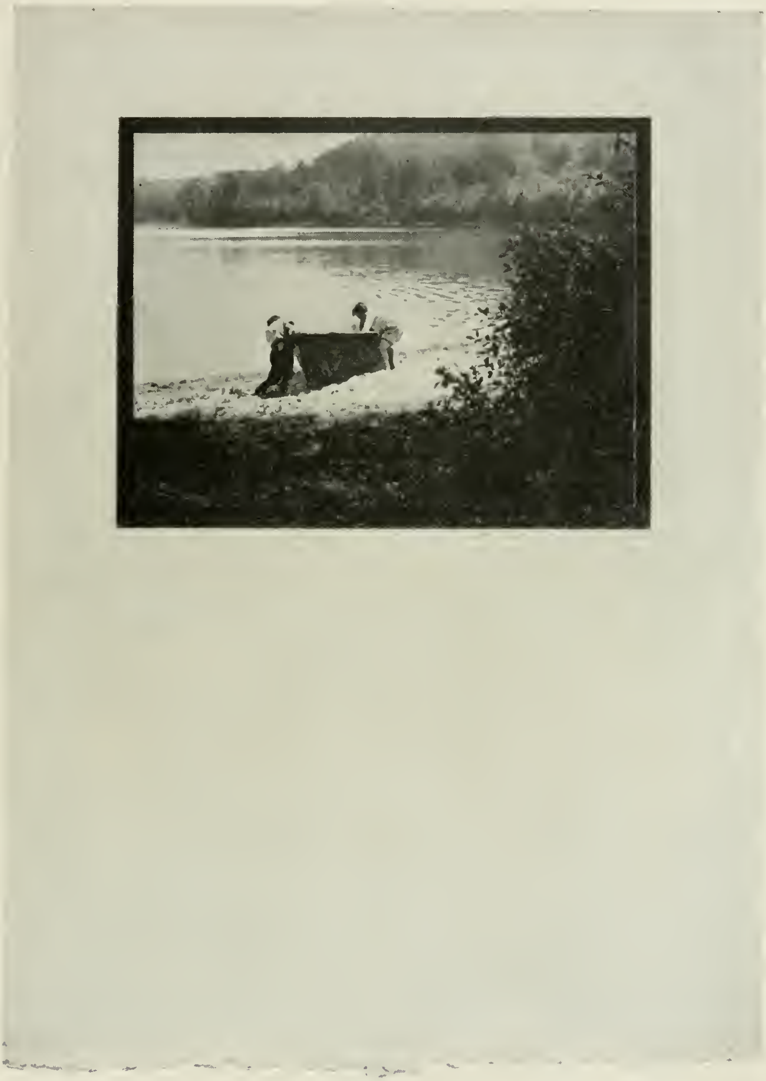

Fig. 83
The Explorers—The calendar form of mounting. Suitable and attractive for small prints

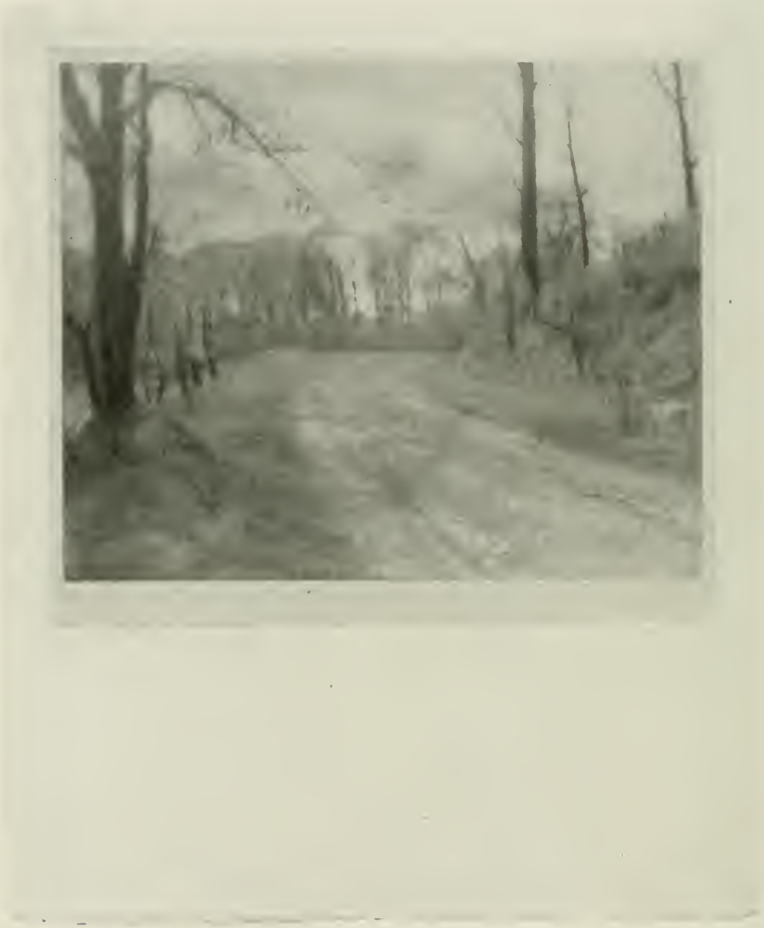

Fig. 84

Spring Landscape—The Calendar form of mounting which is suitable for large prints—8 x 10 or larger

For inner mounts ordinary cover paper stock is fine, for it is not heavy and can be secured in almost any color. Personally, I do a great deal of double mounting and my assortment of mounting material is as follows:

A supply of cover paper in these colors; dark buff, light gray and white.

A supply of cover paper in these colors: dark brown, buff, light gray and dark gray.

In general, I would use for snow pictures a dark inner mount on a light gray outer mount, or on a white outer mount. I would use for buff prints a dark brown inner mount on a light brown outer one, or on a white.

Let me give you a general principle to follow in fitting mounts to your prints. Neutral tones are best where the purpose is to emphasize the highlights and deep shadows of a picture. But the color of the mount should never blend with the color of the print. The color of the mount should harmonize with the predominant tone in the picture, or contrast with it along the lines of complement. The first method is the easier for the beginner to follow.

The texture of the mount should correspond to the surface of the print; for instance, rough surface prints should be mounted on rough surface cardboard, etc.

Embossing

Perhaps you are fond of embossed mounts, if so, here is a very simple method of preparing them:

Carefully cut a piece of cardboard so that it is slightly larger than the print to be mounted. Place the mount, face down, on this board, or form, being very careful to see that the form is placed exactly where you want your picture. Run a smooth device, such as a tooth brush handle, a table knife handle, or an embossing tool around the edge of the form, on the back of the mount, applying considerable pressure while so doing. Be careful to make good square angles.

Attaching Prints to Mounts

In attaching prints to mounts they should first be straightened so that there is no tendency for them to curl. This can be done by laying them face down, one at a time, on a smooth, clean surface, and drawing them under pressure between the ruler edge and the surface. When this is done, run a narrow line of glue along the top edge of the print and place it on the inner mount, and lay a heavy weight on it.

I find it effective at times to run the line of glue clean around the print, especially if the print is single weight and prone to curl.

Attaching the inner mount to the outer is simply done, for all the work necessary is to dab glue on each corner, place it on the large mount, and then subject it to a slight pressure.

Cut-out Mounts

Another method of mounting is to cut out the center of the mount so that the part cut out is a trifle smaller than the print, and to paste the print by its edges to the back of the mount and over the cutout.

Making the Album

Pictures that are worth keeping can be preserved in no more convenient form than in an album. Albums are of several varieties, such as the loose-leaf, the bound style, and the scrap book form. The loose-leaf is the most desirable form, because leaves can be detached or inserted at will.

There are all kinds of methods of sticking in prints, one of the most undesirable of which is that of placing so many on a page that their attractiveness is lost in the jumble.

In choosing an album, it is wise to select one large enough to hold four of your small size prints on a page. Group your pictures according to what they represent, and place them in the album according to their relationship from the point of view of time. In this way you will have a chronological picture history of many of your interesting experiences of the year, such as trips, your vacation, and incidents in which your children play a part.

It seems that most amateurs prefer to have white margins around their pictures, but I believe that my own system is far more pleasing from an artistic point of view, even though it does require more detail work. I will give you the process, step by step:

1—If the prints are dry and not perfectly flat, soak them for a few minutes in water.

2—Place them on glass and squeeze out the water as though you were preparing to mount them on cardboard.

3—Place them separately, one at a time, on a strip of clean blotting paper, 10 feet long and 1 yard wide.

Place on this strip another strip of the same dimensions, and roll the whole thing into a cylinder.

4—When they are absolutely dry, trim them according to the instructions given under "trimming."

5—Cut up some cover paper stock into sheets slightly larger than your prints. If your prints are black and white, use gray or white stock; if they are brown or buff, use brown buff or white stock. For white stock you can use the backs of discarded prints, as they are ideal for the purpose, in that their tendency to curl one way counteracts the tendency of your pictures to curl the other way.

6—Stick the trimmed prints, by the four corners, to the cover paper or the spoiled prints, and then place a weight on them.

7—When you are sure that the glue has hardened, trim off the mount until you secure the desired margin—a margin of an eighth of an inch should be left around the picture. Then arrange the prints in a pile in the order in which you will place them in the album.

8—Remove the fastening of the loose-leaf album and taking each sheet separately, paste to it, by the four corners, the pictures which you have chosen for that page. Do not crowd the pictures, and be sure that those which you place innermost are at least two inches from the inner line of binding. The object of this is to avoid having the inner ends of the pictures become loosened, after awhile, as a result of the strain which would occur if they were placed so far in that the ends were directly over the sharpest bend in the page. Place the leaves, when filled with pictures, under weights again.

You will find it expedient to fill but one side at a time, reserving those pictures in order, that you are to place on the other side of each sheet.

10—As titles and captions add to the interest of albums, you may desire to make such notations in yours. If the pages are of smooth, dark stock, such as will take ink, white ink will be appropriate; if the leaves are of the porous kind, you can add your titles on the lower margins of the picture mount; or you can attach special small stickers to the leaf beneath the picture.

When the album is shelved, it is well to have at least a slight pressure exerted on it all of the time during which it is not in use, in order to prevent the persistent tendency to curl.

CHAPTER XI

SPECIAL TREATMENT OF THE NEGATIVE

WITH the ending of Chapter 10, we pass out of the realm of the so-called beginner's class, and tackle more advanced subjects. Of special importance among these is that one which has to do with special manipulation of a plate or negative.

The four subjects to be considered in this chapter are as follows:—

1—Intensification; 2—Reduction; 3—Blocking-Out; 4—Developing so as to prevent Halation.

Intensification

A correctly developed negative that was correctly exposed, or within reasonable limits over-exposed, will approximately record the range of tonal contrast that existed between the lights and shadows of the subject photographed.

If the negative was under-developed it will, whether it was correctly or incorrectly exposed, record less contrast than was visible in the subject.

A negative that was so much under-developed that there is little contrast between the highlights, half-tones and shadows, will be thin. It will lack density and will yield none but a flat print on any grade of paper. The printing quality of such a negative usually can be improved by intensification.

There are two satisfactory methods of intensifying a negative: We can increase the density of the image by depositing another metal on the silver that the negative contains, by using an intensifier, or we can re-develop it more opaque to actinic light.

Both of these methods affect the various parts of the image in proportion to the thickness of the silver deposit. This means that the highlights gain more in density than the halftones, and the halftones gain more in density than the detail in the shadows. The result is that the negative is rendered more contrasty and will, in consequence, yield a print showing greater contrast between the lights and shadows than could be shown by any print made from the negative before it was intensified.

While intensification will usually improve under-developed negatives that are free from fog, it will seldom improve a negative that has been fogged, because all intensifiers will increase the density of the fog as well as the density of the image.

The only negatives that can be improved by intensification are those that were under-developed. Under-exposed negatives lack detail and *intensification cannot add detail to a negative.* It can only increase the density of the image that the negative contains.

Many extremely thin and flat negatives will yield such good prints on "contrast" paper that they do not need intensifying. Should you, however, prefer to use a softer grade of paper, or wish to make sepia toned prints, enlargements, or lantern slides from a thin negative that lacks sufficient contrasts, the negative can usually be improved by intensification.

Intensifier can be bought all ready for use, or it can be mixed as follows:

1.	Bichloride of Mercury (corrosive sublimate) poison	75 grains
	Dissolve in water	5 ounces
2.	Potassium Iodide	112 grains
	Dissolve in water	2½ ounces
3.	Hypo	150 grains
	Dissolve in water	2½ ounces

Dissolve separately and combine No. 1 with No. 2, and the resulting solution with No. 3.

The formula just given is not advised, except where considerable picture work is being done; the tube form is perfectly sufficient and satisfactory for all ordinary purposes.

The Process of Intensifying

The operation of intensifying can be done in daylight, as light has no effect on the negative during the process. If the negative has been allowed to dry, soak it in water for ten or fifteen minutes until the film is thoroughly softened. Place the negative in a clean tray and pour over it the solution as prepared. Soon the negative will take on a cream colored tone and must then be closely watched, lest it become too highly colored. As soon as it is slightly colored all over it should be removed and washed in five changes of water. Experience will enable you to determine when to remove the negative from the intensifier, but except for extremely under-developed plates the principal given will suffice.

I shall not give you the process of re-developing to intensify the negative because it is more difficult to perform with good results.

In intensifying, be sure that your negatives have been thoroughly washed free of all hypo before placing them in the intensifying solution, otherwise stains will result.

Reduction

It is a very common mistake with beginners to over-develop their negatives by leaving them too long in the developer, or by using a too warm developer, or by improperly weighing out their chemicals, if making their own solutions, the developing agent being made too strong.

In cases where the negative is almost unprintable it can be greatly improved by "reduction" i. e. placing it in a solution that will remove some of the silver from the image, thus making it less intense.

There are two kinds of negatives that can be improved by reduction:

1. Negatives which are too dense all over, and lack contrast, due to over-exposure and over-development. For this kind of negative use the following:

A

Water	16 ounces
Hyposulphite of Soda (hypo)	1 ounce
(Hydrometer test 15°)	

B

Water	16 ounces
Red Prussiate of Potassium	1 ounce

As this solution is affected by light, the bottle containing it should be of amber color or wrapped in opaque paper and kept in the dark when not in use.

Mix for immediate use:

A	8 ounces
B	1 ounce

Use in subdued daylight. The negative can be placed in this solution directly after fixing. If a dry negative is to be reduced, it must be soaked in water for at least half an hour before applying the solution. To avoid streaks, always rinse the negative before holding it up for examination. As soon as sufficiently reduced wash thoroughly.

2. Negatives in which the detail in the shadows needs to be held as it is, but whose lights are too dense, due to harsh lighting or under-exposure combined with prolonged development. For reducing negatives of this kind use:

Permanganate of Potash	45 grains
dissolved in	
Water	16 ounces

This solution keeps best in weak light.

Be sure that the negative is washed free of all hypo, before placing it in this solution. If the negative has been previously dried, soak it for at least 20 minutes in water—the harder the film on the negative has become, the longer it will need to be soaked in water, and in the reducing solution. It is preferable to reduce when necessary immediately after fixing.

When the negative is thoroughly soaked, immerse it in the Permanganate solution for from 30 seconds to two minutes, according to the amount of reduction that is necessary. Then remove and wash until the wash water no longer has any color.

Then immerse the negative, which will have a yellowish brown color, in a fresh Acid Fixing Bath and leave it there until the brown color has disappeared. After a few extra minutes, wash for 15 minutes and then dry.

Blocking Out

Occasionally it will be found desirable to print only a portion of a negative, for instance, the head and shoulders of a figure that is surrounded by annoying details in the background.

This is done by smearing opaque over the undesirable portion so that it will not print out at all. Care must be used, however, when working close to the outline of the desired portion, not to run the opaque across it on to the figure itself. Run around the part to be blocked with pen and ink first, this will help a lot in preventing the opaque from lapping over.

A simple method for holding back portions of a negative in printing is to paste onion-skin paper tightly over the front of the printing frame, and to place the negative in the frame, and then to hold the frame without the cover in such a position against the light that the image can be seen through the paper. Then rub charcoal pencil over the paper in such a manner that the shading comes exactly over the portion which you wish to hold back or even block out. Naturally the paper will diffuse the light and thus necessitate a slightly prolonged exposure, but the resulting print will possess better gradations, especially if it is from a thin negative.

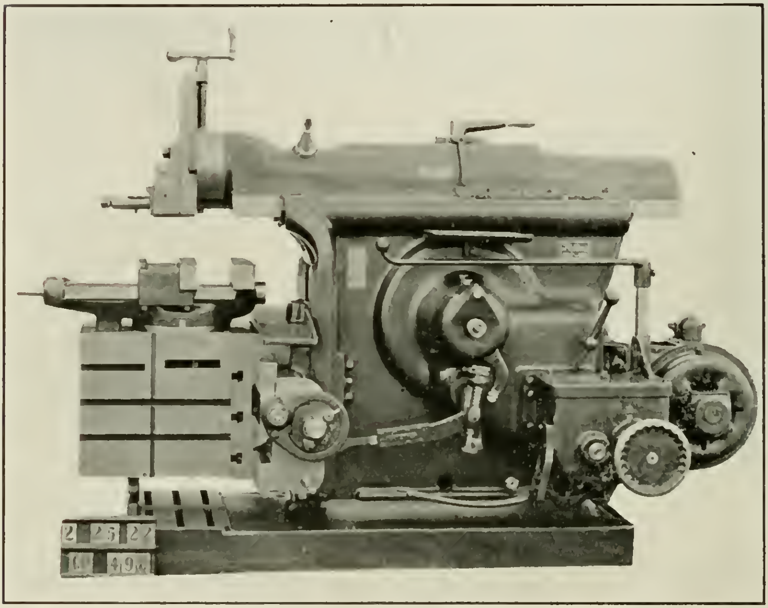

Fig. 85

Illustration of blocking-out. The original background consisted of brick walls, etc. Opaque enabled us to secure a plain white background. By *Elmer Guptil*

An ideal method of subduing parts in a negative that print too dark is to fasten a piece of ground glass to the negative, glass side to glass side, and to then work with a soft pencil on the ground glass. See Fig. 87.

Developing to Prevent Halation

Halation is a bugbear in photography, especially when single-coated plates are used, and where extremes of light and shade are encountered, such as in interior views including windows; views including the sun; and openings through trees where time exposures are made.

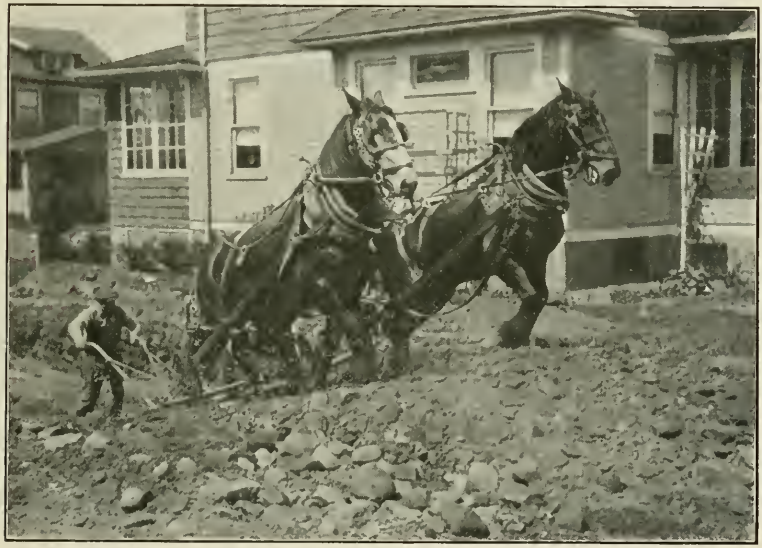

Fig. 86

The picture with a background that is annoying

As previously explained, halation is a result of reflection of rays of light from the glass side of the plate. These rays in being reflected, naturally affect the silver salts all around the particular section of strongest light, and, unless some preventative is applied, will cause such a deposit of metallic silver that when the negative is printed a halo will appear around the over-exposed sections of the highlights.

So-called double coated plates contain two coats of emulsion, the lower coat being a slow emulsion, the upper a rapid emulsion. It is the upper coat that actually registers the picture, the lower acting as an absorber of the rays, and thus preventing their reaching the glass with sufficient intensity to produce reflection.

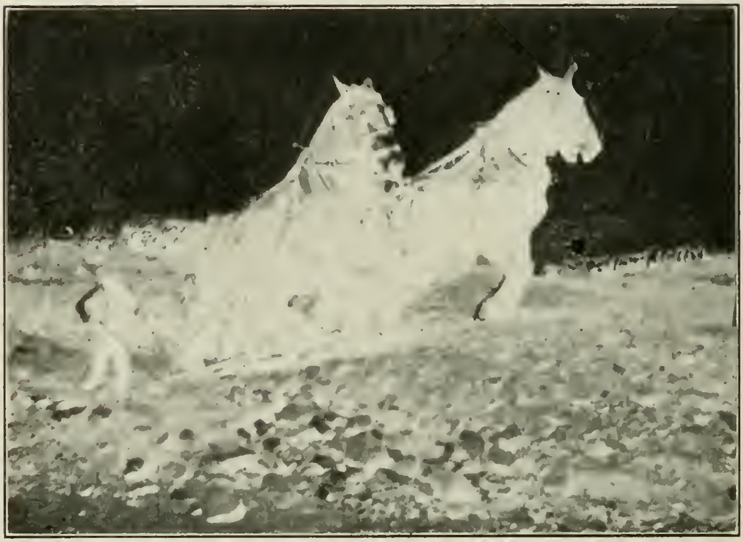

Fig. 87

Method of working on a background by use of a ground glass, fastened to the film or negative, back to back

Such plates should be developed in a rather dilute developer, so that development can be prolonged sufficiently to affect the lower film, which will take about double the amount of time.

Another method of preventing halation is to paint the back of the negative with opaque; and still another method is to stick a sheet of opaque paper to the glass side.

But even with all these precautions the camerist is confronted at times with conditions which require special development of the plate in order to prevent halation.

Fig. 88

Over the Top—Print made after ground glass work

Developing to Prevent Halation

Sodium Carbonate, as explained under "more about developing," is an accelerator, and is used in the developer because of its rapid action on the silver salts in the emulsion. It is evident that the greater the amount of carbonate used, the denser the highlights will be; and the less the amount used, the less dense the high lights will be. But a definite amount is necessary in order to prevent flatness. Now by carefully regulating the developer during development of the plate, you will appreciate that it is possible to gradually develop out the highlights by slowly adding the carbonate solution until an even development is produced, *provided correct exposure was given the plate.*

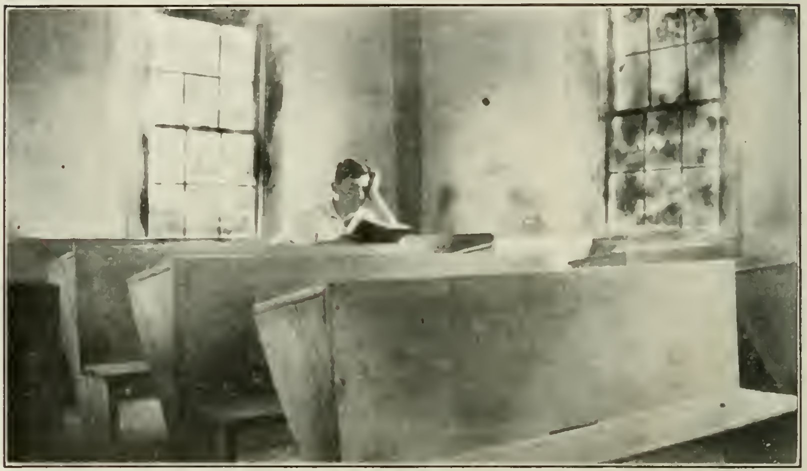

Fig. 89
A blotchy attempt to reduce, locally. Caused by using the reducer too strong and not rinsing often enough

In preparing your non-halation developer, mix it according to instructions with the exception of the amount of carbonate of soda. Make your carbonate solution separately by dissolving the requisite amount in one ounce of water. Start your development in the

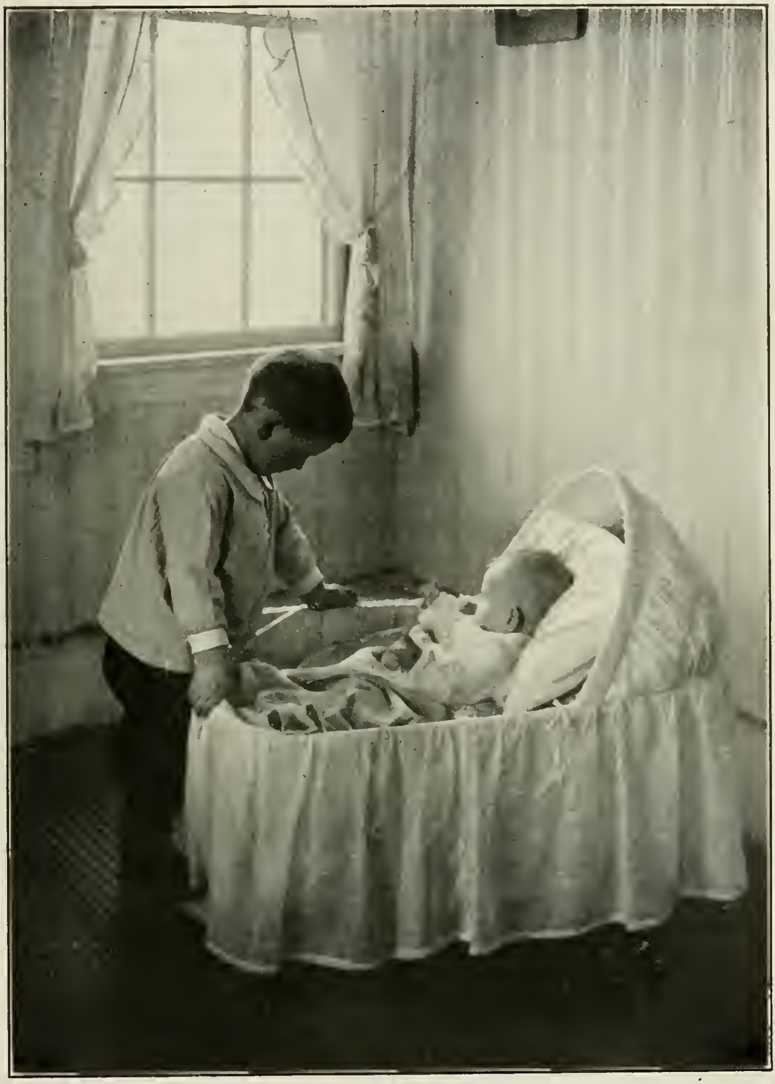

Fig. 90

Big Brother and Little Sister—A clean cut example of reducing. The plate was an ordinary single coated plate so it was necessary to reduce the slight halation that developed around the window incomplete developer, keeping the tray covered, because it will be necessary to prolong the development to over half an hour, thus facilitating fog conditions. Add several drops of carbonate solution at intervals of three minutes until the plate is developed. You will note, as development progresses, that the parts where halation threatens will be held back, thus permitting the shadow portions to get a start before the intense highlights are too dense. You may also note that when the plate is evidently developed as far as safety will

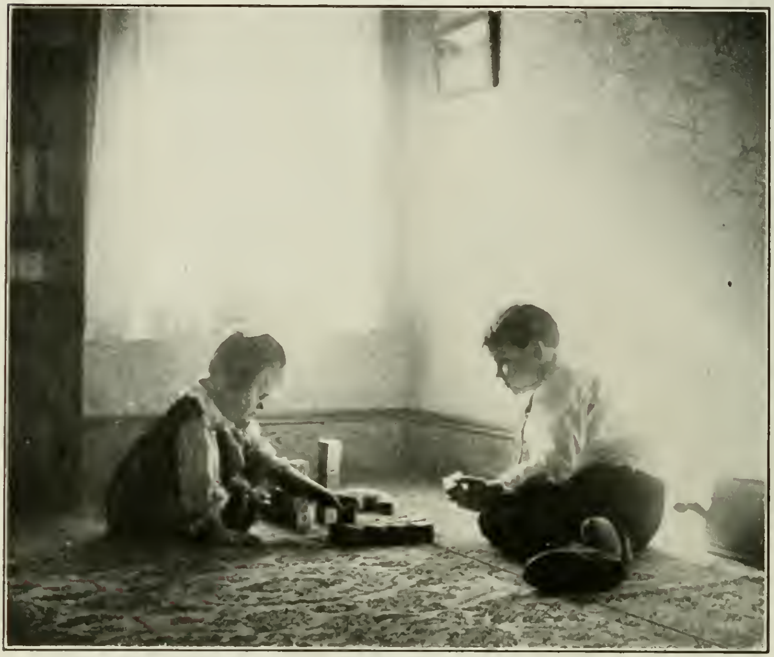

Fig. 91

A bad case of halation as a result of using an unbacked, single coated plate.

permit, it is flat. If this be the case, pour in all of the carbonate solution and then carefully watch the back of the negative lest the highlights come through too strongly. Caution: In pouring in the carbonate solution, don't pour it directly on to the negative, but lift it out first, otherwise it will be unevenly developed.

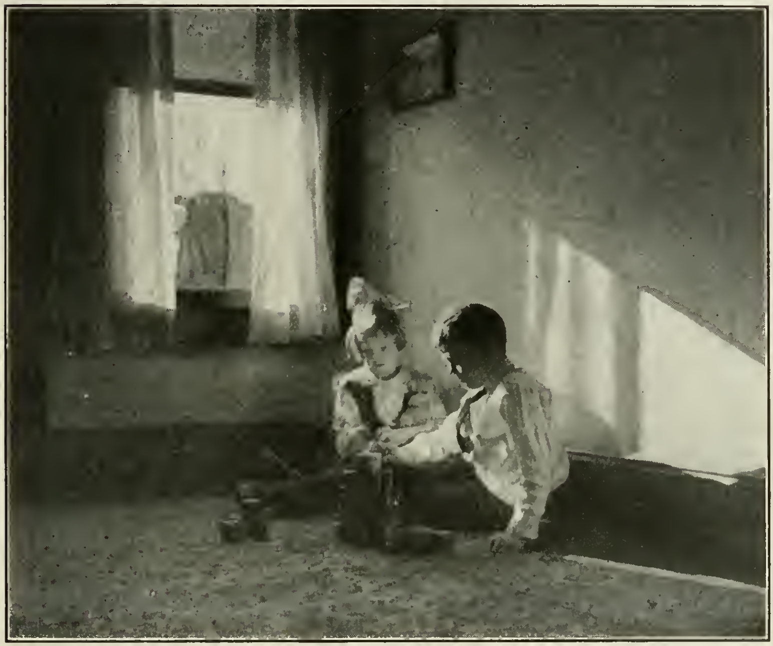

Fig. 92

The Builder—A picture devoid of halation and yet taken at the same time as Fig. 91. A backed, double coated plate, developed in a non-halation developer enabled us to produce this result. The exposure was 8 seconds at F6.3 with a 3x ray filter

You will not get perfect results the first time you try this experiment, but practice will enable you to surprise yourself in your ability to secure beautiful "against the light" effects.

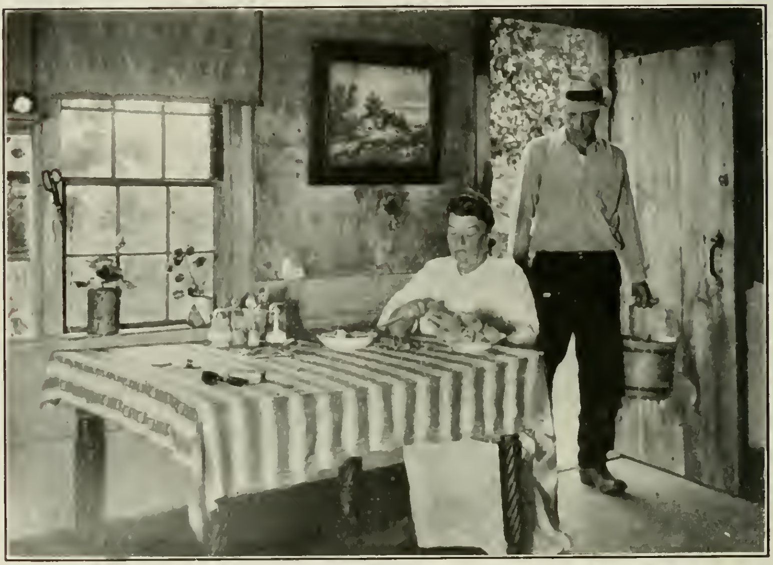

Fig. 93

Nearing "Mealtime"—Another method of preventing halation is to use a combined flash and time exposure

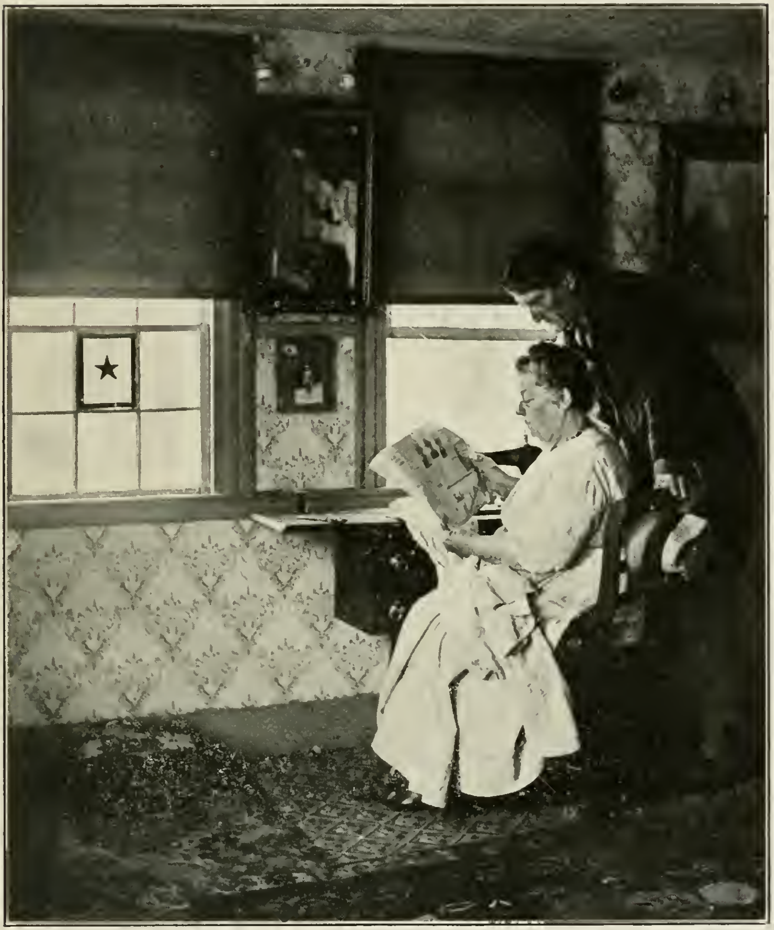

Fig. 94

The Casualty List—Taken with a plate backed with opaque; given six seconds at U.S. 8 and developed in a developer with but half the specified amount of carbonate

Chapter XII

ELEMENTARY ENLARGING

PROBABLY the most fascinating phase of photography indoors is that of making large pictures from comparatively small negatives. It is not only fascinating, but it is also educational, for the operator soon perceives that detail which seemed quite unnoticeable in the small picture is either an asset or a liability to the merits of the large picture. Therefore, in enlarging, one will learn more about composition in a few trials, than he would otherwise in a year; and besides, an enlargement, when properly made, is so far superior to a print, that many advanced amateurs use only small cameras and make enlargements from all negatives which they value.

There are gradations of light and shade in every good negative which cannot be detected by the unaided eye, but which, when the negative is enlarged, become clearly visible.

The amateur who can afford it, both from point of time and money, should equip himself with an enlarging outfit at the earliest opportunity.

As to the type to secure, I would discourage the construction of a daylight arrangement; this advice is given as a result of having tried out several methods. There are several enlarging machines on the market of both the fixed focus and the focusing types. If, however, you prefer to rig up a daylight arrangement of your own, I would recommend to you How to Make Good Pictures, published by the Eastman Kodak Co. In this splendid little book you will find specific instructions on making such a device.

If your camera is a Brownie, I would advise purchasing a Brownie Enlarging Outfit, because of its simplicity of operation, no focusing being required. Its advantage is that only one size of enlargement can be made with it, and in making this, the whole negative is necessarily enlarged.

Complete enlarging outfits, equipped for making a wide range of enlargements, are very expensive, so if you prefer to rig up an outfit, at a mediocre expense, it is quite possible, if you are at all clever at craftsmanship. You can use your camera as the enlarger, if you desire, but unless it is at least a 5 x 7 with a long bellows, you should purchase a second-hand view camera and fit into it the lens from your regular camera.

As only the elements of enlarging are to be taken up here, I shall not go into further detail in regard to securing and fitting up an outfit, but will proceed with instructions on the process.

Equipment Needed

Enlarging Paper
Cardboard for Easel
Graduate
Orange colored Cap for Lens
Opaque Masks, unless the negative just fits the holder
Print Paddle
Towel
10% Solution of Potassium Bromide
Negatives
Scissors, or Trimmer
Red Bulb (if electricity)

Trays for Solutions as follows:

1—Developer	3—Stop Bath
2—Water	4—Fixing Bath

Large-headed Pins
Solutions, etc., as for printing.

Enlarging Papers (Bromides and Chlorides)

Bromide paper is coated with a sensitive compound composed principally of Bromide of Silver and pure white Gelatine. It is similar to the emulsion of the plate, but is much less rapid, thus permitting of manipulation in a stronger light than would be safe for plates.

Bromide of silver gives a pure black tone when exposed to light and then developed. The unexposed portions of the paper remain perfectly white except on buff paper.

There are several beautiful makes of enlarging papers on the market, and of such degrees of contrast as to produce pleasing enlargements from any half-decent negative. Personally, my choice of such papers is as follows:

For flat and thin negatives:
- Eastman Brilliant Velvet Bromide
- Mimosa Verotype
- ENLARGING [illegible]

For normal negatives:
- Artura Carbon Black
- Mimosa
- Velours Black

For contrasty or dense negatives:
- Artura Carbon Black
- Royal Bromide
- Eastman Standard Bromide
- P. M. C. Bromide

I would advise that you start with Brilliant Velvet Bromide and Artura Carbon Black, using the "buff" grades of Artura for all except snow pictures. The Artura Buff with a smooth surface is ideal as a general brand of paper.

Making the Exposure

The enlarging room should be sufficiently lighted with a yellow light to permit of your working with ease. Place the negative upside down in the negative holder, with the film side towards the lens, and mask it with a cut-out of opaque paper, so that no light can enter the camera except through the negative. If a film negative is being used, two sheets of plain, clean glass should be used in order to hold it in place, the negative being placed between the sheets. Set the lens shutter on T and open it.

If the enlarging light is now turned on, a blurred image will appear on the easel. You should have previously drawn, in heavy lead pencil marks, on the cardboard of the easel, a rectangular outline of the size to which you wish to enlarge the picture.

By moving the lens forward and backward you will be able to secure a sharp image of the negative, then, make it the desired size, adjust the easel forward or backward and focus again.

It will also be necessary to move the lens up or down by means of the "rising front," and to adjust the cardboard on the easel in order to have the image properly centered. If, however, condensers are used, the lens must be centered on the rising front so that it will be on an axis with the condensing lenses, unless a small negative is being used, in which case, even though it is not exactly in a line of axis with the condensers, it will still be within the circle of uniform illumination.

Focus with the lens wide open, then, for all subjects except bust pictures, stop down to F16 or smaller.

When enlarging from portrait negatives, much greater softness and roundness can be secured by stopping down to F8 for one half the exposure, and completing the exposure with the lens wide open.

If you have an orange or a ruby glass (not a yellow one) to place over the lens, you can place your test slip on the easel wherever you desire without danger of its fogging. The test slip should be at least 1 x 3 inches in size, and it should be placed on that portion of the image which is most important—for instance, faces, etc. If you haven't a filter, fasten a pin to the easel over the portion of the image which you wish to test; turn off the enlarging light, or cap the lens, and pin your test slip over the section already marked. If you have a ruby bulb burning, you will be able to see what you are doing.

Be sure that your package of paper is closed, whenever white light is passing through the lens.

After making your test exposure, develop the slip under the rays of an *orange* or *ruby* light— don't use a yellow light for developing bromides! If the slip turns too dark inside of 1½ minutes, provided you are using the developing formula recommended for the paper that you are using, your exposure was too long; on the other hand, if it is not dark enough in the same length of time, it was under-exposed.

When you have determined the exact time to give pin a sheet of paper to the easel and expose it. If certain portions of the image need more exposure than other portions, you can easily shade the lighter portions by holding a card in front of the lens in such a manner as to cast a shadow where desired, leaving the unshaded portion to print longer. When shading, don't hold the shader motionless, otherwise the line of differentiation may show on the developed picture.

When ready to develop, first immerse the sheet of paper in plain water so that when it is placed in the developer, the liquid will cover it quickly and evenly.

Points to observe regarding the developer are: 1—The solution recommended by the manufacturer of the paper should be used if you have facilities for weighing out chemicals; otherwise Nepera Solution, or tube developer can be used. 2—The temperature should be 70 degrees Fahrenheit. 3—When the developer is not being used, pour it back into the graduate; it will not oxidize as fast if you will do this.

To develop: Place the paper face up in the tray and flow the developer quickly and evenly over the surface. See that no air-bells adhere to the surface. Rock the tray till the print is developed.

The image should appear in from 5 to 10 seconds, and should be fully developed in not less than 1½ minutes.

Prolonged development will cause yellow highlights and stains. Developing according to the "time and temperature" method is the best advice that can be given anyone when learning to enlarge. It is absolutely reliable, provided the developer which is recommended for the paper is being used; in fact it is so reliable that you can be sure that if the image appears in less than five seconds, the print has been over-exposed, and if it fails to show in ten seconds the paper has been under-exposed.

If the highlights develop out gray in color (foggy), use a drop or two of Potassium Bromide thereafter.

Fixing

Prepare the fixing bath with as much care and accuracy as you give to preparing the developing solution. You can use the same bath which is recommended for D. O. P. Papers, or for plates, or you can use a plain bath consisting of Hypo, 16 ounces, and Water, 128 ounces, to which add when thoroughly dissolved, 4 ounces of Velox Liquid Hardener.

The bath should never be used warmer than 70 degrees—NEVER!

Prints should be rinsed in a stop bath made of plain water, 32 ozs., and an ounce of Acetic Acid before being placed in the fixing bath.

With the print-paddle, keep the prints separated by moving them around, every minute or so.

Washing

Wash the prints for an hour in running water, or through ten charges of water in trays, or dishes, allowing about five minutes for each change.

When running water is used for washing, the stream should not be allowed to fall directly on to the prints, as it might cause blisters. Place a tumbler in the washing tray and allow the water to overflow from it into the tray.

Drying

Remove the prints from the wash water and place them, face down, one on top of the other, on a sheet of glass. Place a towel or blotter over them and, with the print roller, squeeze out the excess water, then place them face down on clean linen or cheese cloth stretchers to dry. Or place them between long strips of blotting paper and roll the whole thing into a cylinder so that the surfaces of the prints will be convex, then when the prints are dry all tendency to curl will have been overcome.

Soft Effects

Soft effects can be secured with either a Verito Diffused Focus lens with or without diffusing stops, or by placing silk bolting cloth over the lens during the exposure. Enlargements of summer landscapes made in this way possess wonderful softness and breadth.

In using the silk cloth be sure that it is stretched over the lens so that no folds occur, and remember to increase the exposure a third or more.

Vignetting

In order to sufficiently expose small portions of an image, such as white dresses, etc., without over-exposing the shadows, cut a small irregular hole in a piece of cardboard, and hold it so that the only light reaching the paper passes through the hole and onto the part to be exposed. Move the card to and from the paper, and slightly up and down to insure covering the whole portion. Such manipulation should be given after the whole paper has been given the appropriate exposure.

In order to hold back small portions of the picture from printing too dark, cut a piece of cardboard to the shape of the portion to be shaded, and stick the point of a long hat pin, or knitting needle, into it; then, keeping it in constant motion, shade the spot during a part of the exposure. For example, if an exposure of 30 seconds is required for the whole sheet, give the whole thing a 20 second exposure, then shade the desired portion during the next 10 seconds.

Clouds can be printed into an enlargement by using a cloud negative for a second exposure after the landscape has been exposed. Two cardboard masks will be required, one to approximately fit the landscape, the other to approximately fit the skyscape.

While the landscape is being exposed, shade the sky by holding the proper mask between the lens and paper on the easel, moving it towards and away from the paper in order to prevent the forming of a sharp horizon-line. Then place the cloud negative in the holder, after removing the landscape negative, and, while exposing the clouds, work the second mask in a similar manner as you did the first mask.

If trees project up into the sky, you must use care in having the mask more correctly cut to fit.

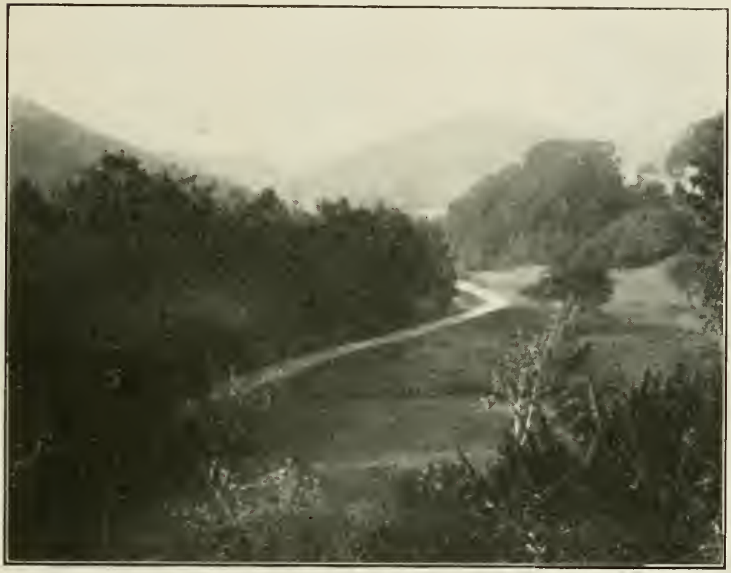

Fig. 95

The Valley Trail—Contact print before enlarging

Frequently, when enlarging from "hard" negatives, and printing in clouds, I do not mask the tree tops at all, preferring that their tops be a trifle dark, to that effect of having a light halo around them, as is apt to be the case unless the masking is very cleverly executed.

To indicate where the landscape ends, make lead pencil marks on each end of the bromide paper where the horizon line lies. The masks should be held several inches from the easel, so that there will be no sharp line of separation, but instead, a blending of sky and land.

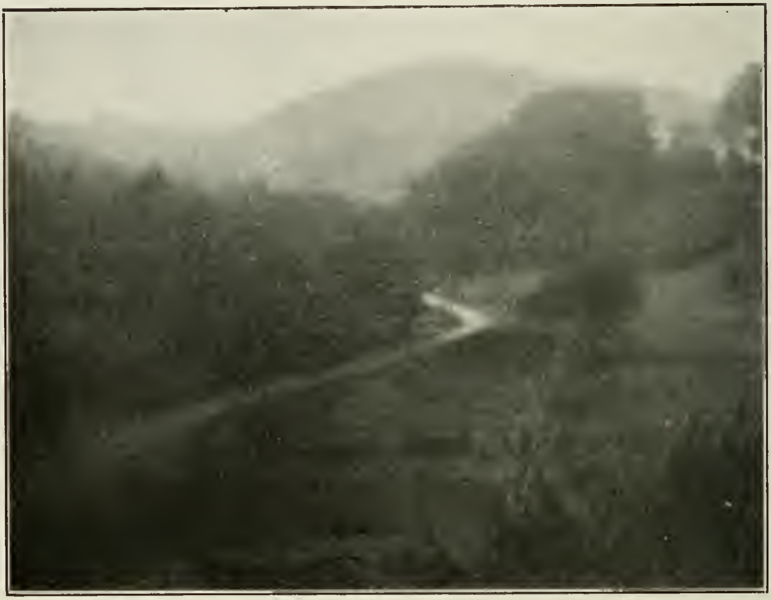

Fig. 96

The same picture as Fig. 95 after enlarging with a Verito Soft Focus lens

Before exposing your whole sheet, you should first make test slips from each negative.

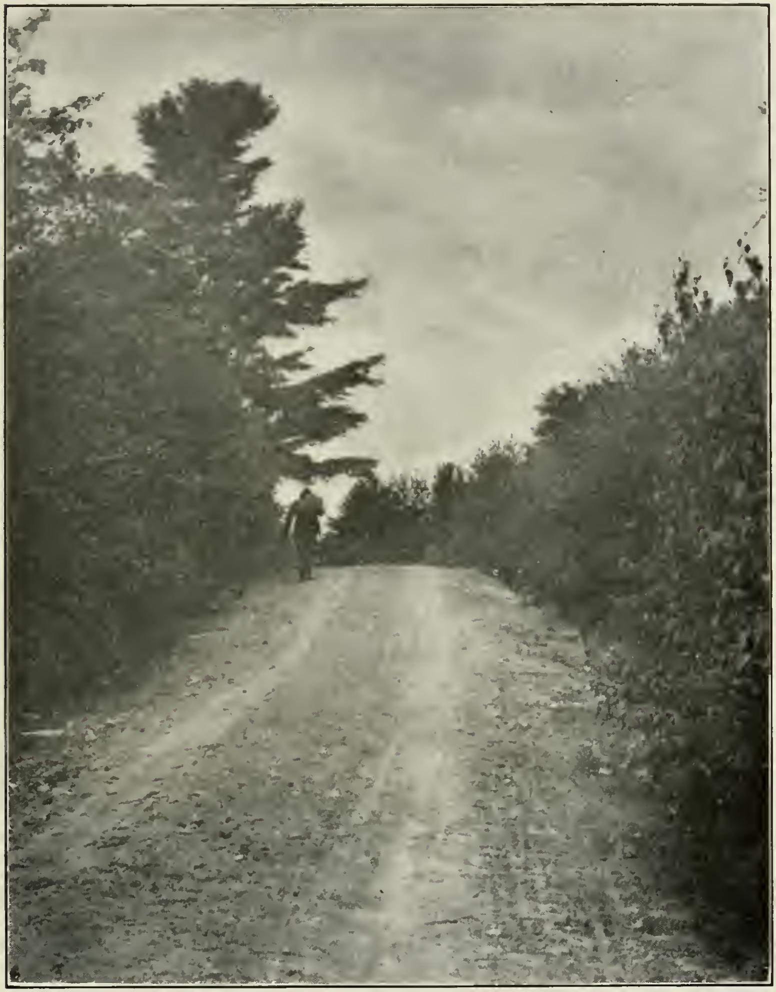

Fig. 97

The Road O'er the Hill—Illustration of poorly executed masking when printing in clouds. The subject is a difficult one because of the irregularity of the skyline

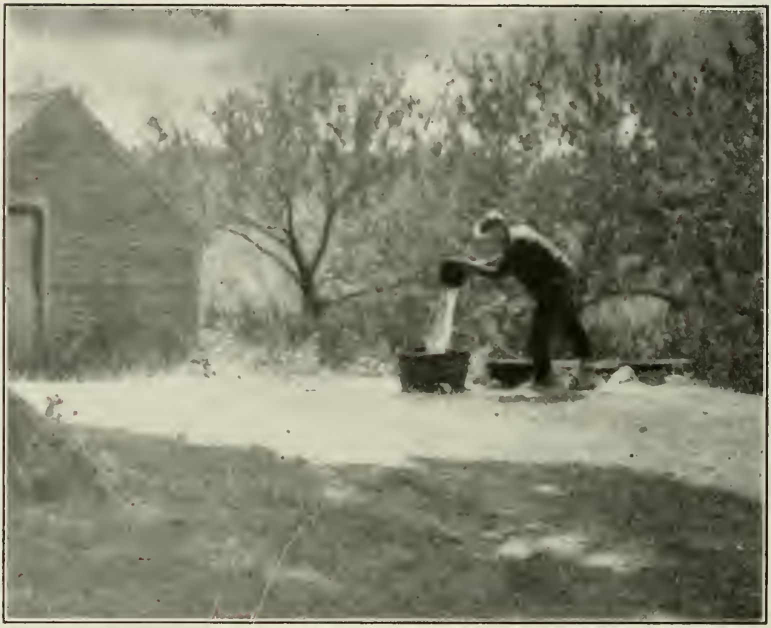

Fig. 98

A Bit of Farm Life—Illustration of printed-in clouds with no attempt to shade the tree tops above the horizon line. The clouds were printed right through them. The effect is noticeable but not real objectionable

CHAPTER XIII

SPECIAL PHASES OF PHOTOGRAPHY

Landscapes

THE success of a landscape photograph depends on the judgment with which the subject is chosen. It is not always which at first sight appears the most beautiful to the eye that makes the best photograph. The moving clouds, in their background of bright blue, contrasted with the brilliant green grass, and the darker colors of the foliage may lose their charm, when rendered in the indiscriminating black and white of the photographic negative. The beginner in photography requires a little education by practical experience before he can see just what will make a good picture.

Remember, first, that a photograph is merely light and shade. Brilliant and contrasting colors, however beautiful to the eye, may make a poor showing when depicted in plain black and white. Don't imagine, however, that grand and impressive scenery is necessary to get pictorial results; frequently the best pictures are the simple subjects close at hand; a clump of trees with cattle grazing nearby; a rustic bridge; or a glimpse of the river with a fisherman watching his line.

Get into the habit of studying the effect of light and shade. Notice the different aspects which the same view presents under the changing light of morning, noon, and evening.

If there are straight lines in the picture, such as a hedge, a road, a row of trees, or the horizon line, select a point of view from which the lines will not run parallel with the edge of your picture.

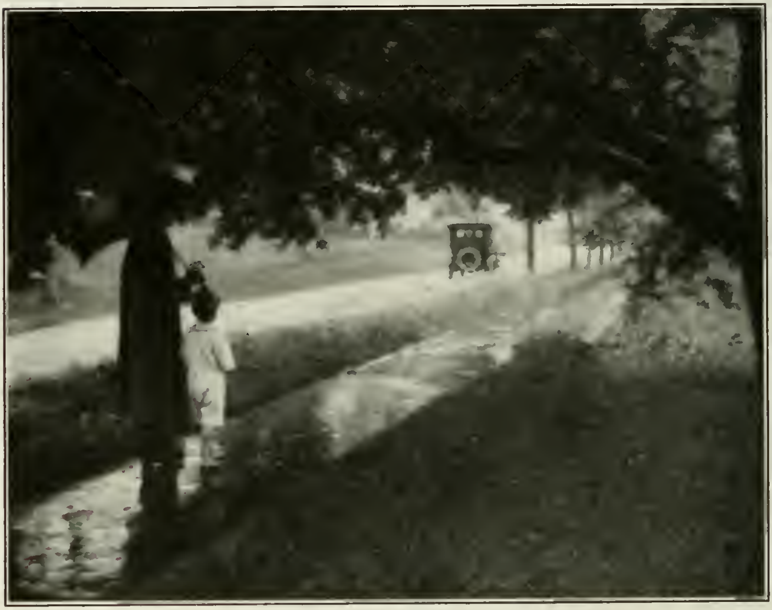

Fig. 99

On One Rainy Day—Properly selected viewpoint. Lines run into the picture —not across it parallel to the top and bottom

The foreground is always the most important part of your picture, and a flat, monotonous foreground, such as a broad, unbroken expanse of water, or a level meadow, must be avoided. A clump of trees, or a boat may relieve a monotonous foreground, and make a view picturesque, that would otherwise be far from artistic.

Choose that point of view which brings into prominence the most interesting features, and endeavor to relieve any monotony or flatness of foreground by the introduction of human figures or anything else that will break up and lend variety to the picture.

There is a mistaken idea prevalent among many photographers that the sun must always be at one's back when making the exposure. Nothing could be further from correct, as, with the sun shining directly back of the camera, only the lighted side of the subject is shown, thus giving no shadows, and consequently no contrasts of light and shade. A picture with no shadows is flat, and entirely lacking in vigor and life. The best results are obtained when the sun is at one's side, so that the subjects in the view present both a brightly lighted

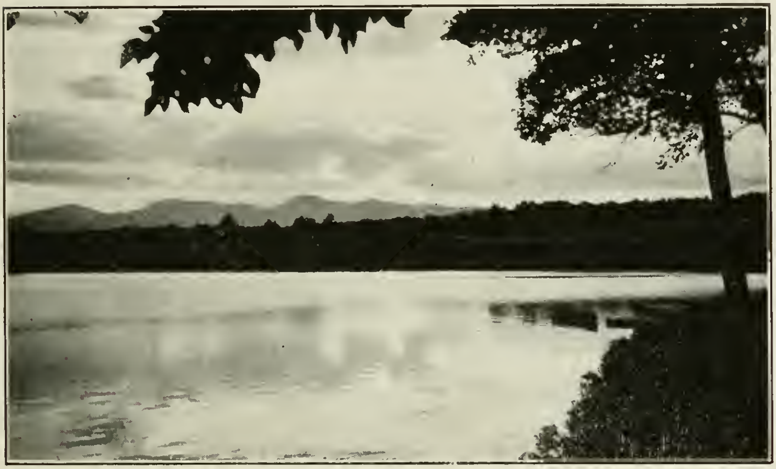

Fig. 100

The Sunset Hour—The type of picture which is always pretty, but in which the horizontal shore lines mar the pictorial beauty of the setting. Taken by *W. R. French* and a shaded side. If the sun is so far in front of the camera that it shines directly into the lens, shade the lens with the slide from your plate holder, or with your hat. If this is not done, the direct rays of light shining into the lens will fog the plate.

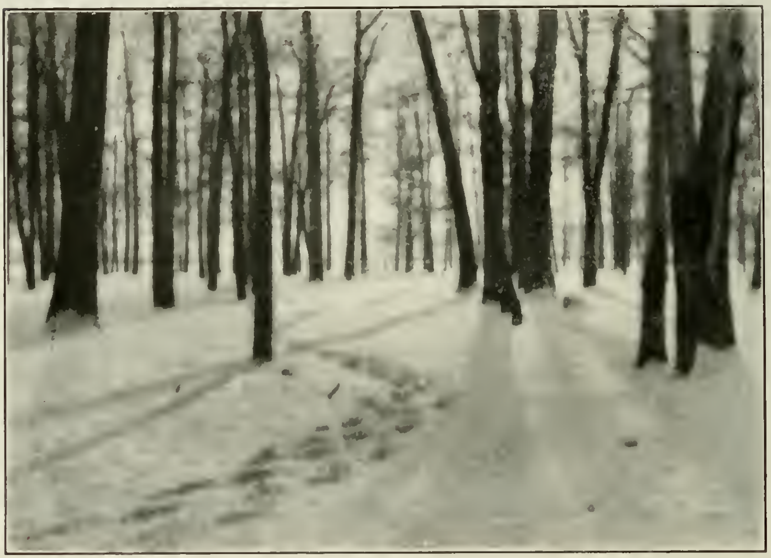

Fig. 101

Shadows on the Forest Floor—Interesting foregrounds are essentials of real pictures. In snow pictures, it is easy to make such foregrounds. By *Olin Banks*

Simplicity is the keynote of all artistic work and you will be able to secure unity by avoiding the common mistake of crowding too much into the picture space, and by choosing that point of view in which the fewest possible lines are found to emphasize the scene. In other words, a landscape should have but one main object of greatest interest. Other objects may be included to afford the necessary variety, but these must be kept secondary to the main object of interest. A good composition is the result of selecting a subject in which all lines lead the eye to a central object.

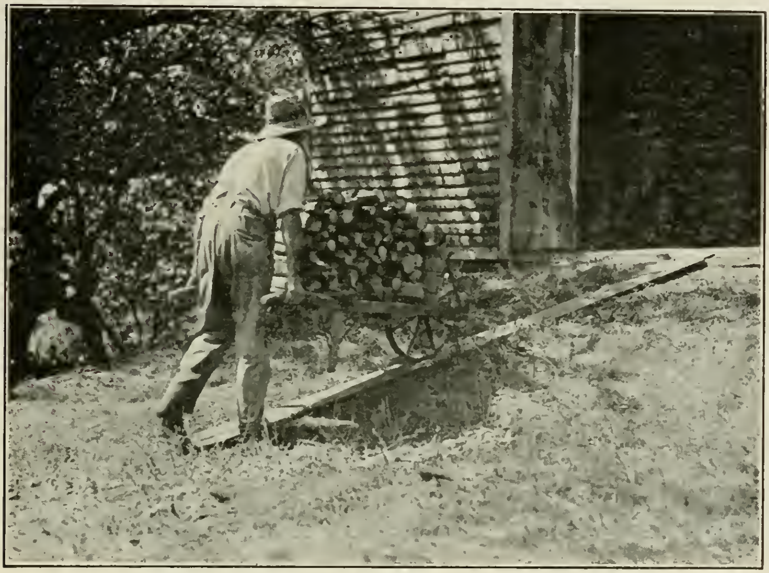

Fig. 102

Day In, Day Out—The out-of-focus foreground, the foreground devoid of character, and the light toned foreground in which picture the heavy tones are in the middle distance and distance, are foregrounds that are undesirable

A single tree with a long slanting shadow will often make a good picture, while the photograph of an entire woodlot would only confuse the eye with much meaningless detail. It is therefore well to keep in mind that it is quite unnecessary when photographing a clump of trees to include the topmost branches down to the roots. Do not attempt to do too much, but rather try to make the most of a few well selected materials. After choosing an attractive subject, walk around it and look it over critically from various angles, and then

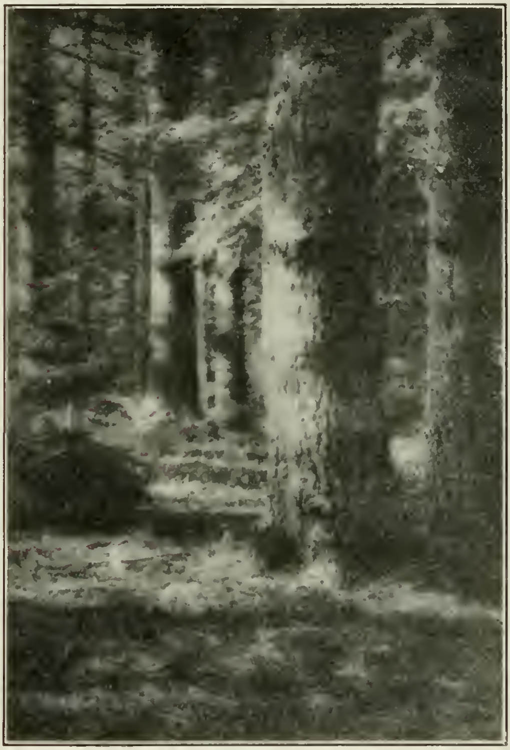

Fig. 103
The Sun's Good Night—Simplicity is the keynote of success in tree work in landscape photography

by making the exposure from the best of these, you are likely to be rewarded with a print that best shows the interest which the scene has created in your mind when you first viewed it.

Again if you aspire to become a real artist in landscape photography, there are two highly essential features of photography with which you should become familiar; one is the art of making correct exposures; the other is a knowledge of "orthochromatics."

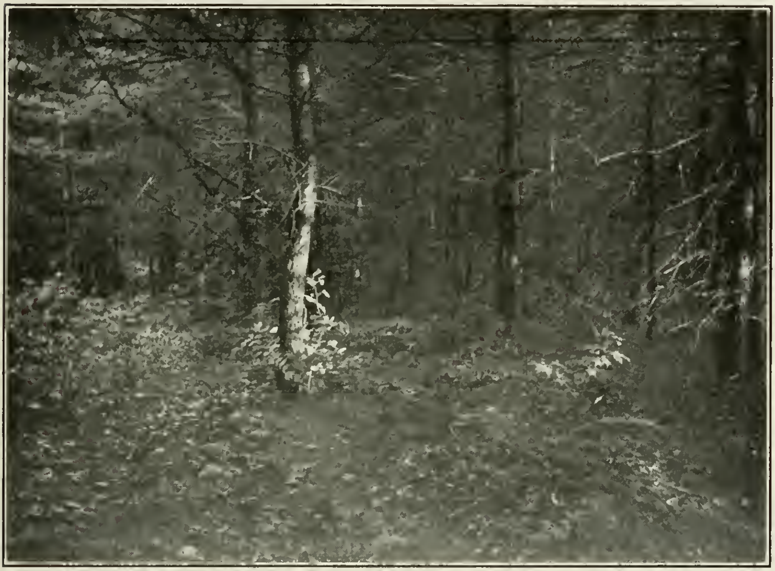

Fig. 104

The Fairy of the Pines—Another example of simplicity. By *Fred Trueworthy*

Exposure in Landscape Work

Again it becomes expedient to emphasize the fact that the beginner, and even the advanced worker, when he is doing landscape work, particularly in the forest or shaded roadways, should have an exposure guide at hand. There is something very deceptive about the light that filters through foliage. There is a big difference in light intensity among trees, which varies a great deal according to the direction of the sun in respect to the camera. Pictures taken against the light and recording only the shady sides of the trees require nearly three times the exposure that would be required with the position of the sun reversed, that is behind the camera.

Don't undertake photographic landscape work in general with the object in view of securing artistic pictures without first securing an exposure guide!

Orthochromatics in Landscape Work

Real success in landscape work involves the use of Orthochromatic plates or films and Color Filters. I will explain why: In the earlier days of photography the plates used gave very untruthful renderings of color values. Yellow and red, for instance, photographed as black, while violet, indigo, and blue photographed as white.

The ordinary plate is highly sensitive to violet, a trifle less sensitive to indigo, and so on; and almost absolutely unaffected by yellow and red and orange.

An orthochromatic plate or film is one in which these errors have been so far corrected as to give truer color value, i. e., the emulsion is sensitive to a wide range of colors in an equal or very nearly equal degree.

With a non-orthochromatic plate you might be making a picture of a bed of flowers containing in the foreground a variety of yellow and dark blue flowers. The negative, owing to its deficiencies, would yield a print in which the yellow flowers would appear darker than the blue ones, though to the eye the yellow flowers would appear lighter. In other words, it would not give, in the resulting picture, the true color values. The fully orthochromatic plate or film corrects the mistakes and renders the color values (the intensities of color) in their proper relation to each other.

But even with orthochromatic plates or films no decided improvement in rendering color value can be made without the use of Light Filters, either in front of or back of the lens. These filters vary in respect to the degree to which they correct orthochromaticism They vary in intensity from pale yellow to orange, and are also made in green, deep blue and deep red.

Each filter has a multiplying factor which enables one to determine what exposure to give, by multiplying the exposure called for in the "guide" by the "multiplying factor" of the filter being used. For instance, if the "guide" indicates that the subject requires an exposure of 1/5 second at F16, and the filter is an "8x" (8 times) filter, the exposure needed is 8 times 1/5 or 1 3/5 seconds. The illustrations following serve to show the advantage of the orthochromatic plate and filter over the ordinary plate with no filter.

As to the choice of Color Plates and Filters, the Standard Orthonon is a very reliable and normally expensive plate for ordinary landscape work, and the Panchromatic plate, a plate that is sensitive to all colors, in combination with a Wratten "K3" Filter, is a splendid plate for subjects possessing many colors.

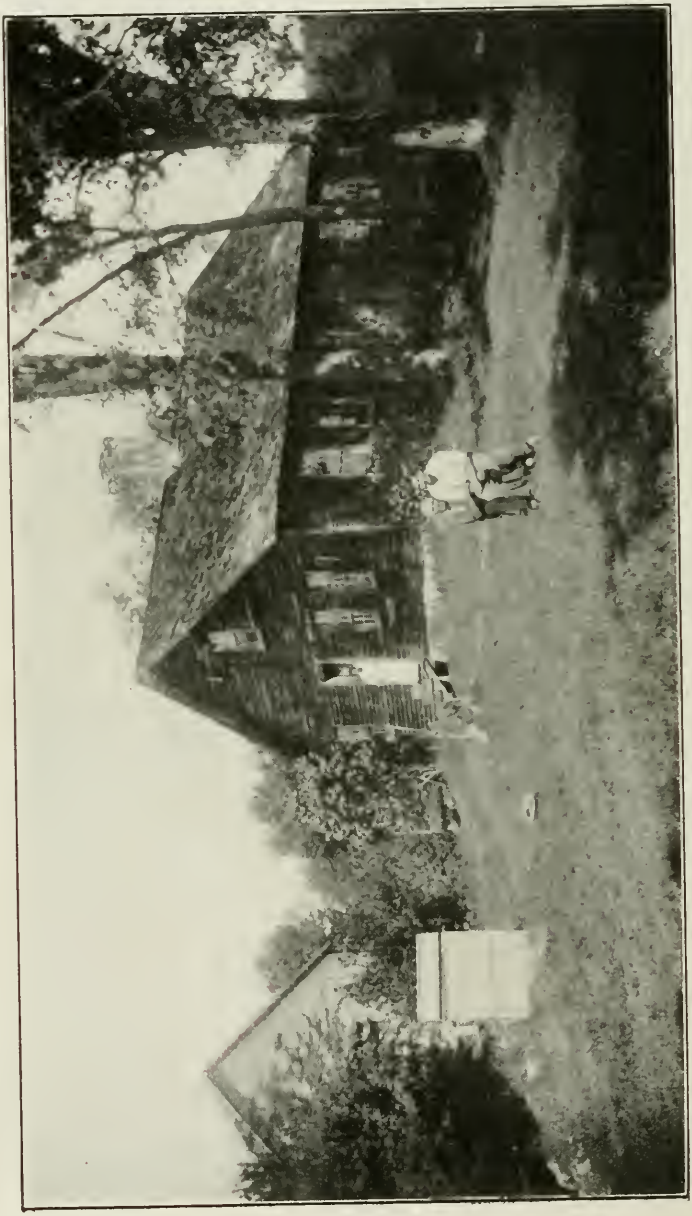

Fig. 105

The Old Homestead—Taken with non-orthochromatic plate and no color filter

The "K1" filter is used when short exposures are of more importance than full correction.

The "K2" filter is used for general work with ortho plates and films.

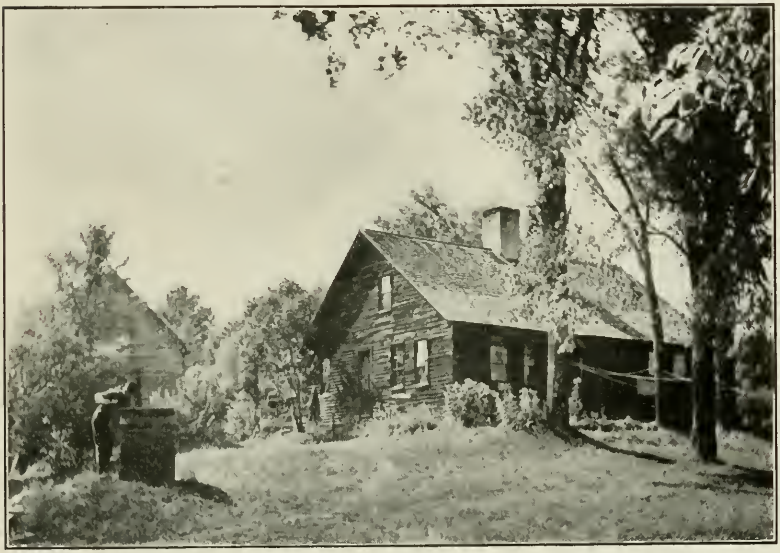

Fig. 106

The Old Homestead—Taken again with Standard Orthonon Plate and a 3x color screen

The "K3" filter is used for full correction with Panchromatic plates.

The "G" filter is used to obtain detail in subjects where the contrasts are in yellow color.

The "A" filter is used only with Panchromatic plates to obtain contrast and detail in subjects of yellow and brown.

The "B" filter is used almost exclusively for commercial work, as is the "C" and the "F" filters.

All of the above mentioned plates and filters are manufactured by the Eastman Kodak Company.

If you care to enter more fully into this field of photography, send to this company for their booklet on Color Plates and Filters.

When developing double coated plates (orthochromatic), don't carry the development until the image shows through to the back of the negative, otherwise your negative will be too intense and contrasty!

More Pointers on Landscape Photography

When human figures are included, they should harmonize with the subject, both in costume and in pose. For instance, a man garbed in a stiff color and derby hat would be out of place in a landscape of a farm scene in which he were depicted in the act of holding a plow.

Domestic animals, if properly placed in the picture, add to the interest of general landscapes.

Avoid having figures of any kind in the act of staring directly into the eye of the camera during the exposure.

In selecting subjects for artistic work, choose roadways with graceful curves; single groups of trees that possess pleasing contours; farm scenes; brooks that are not excessively shaded; vistas through trees, etc.

Avoid having the foreground out of focus, or a foreground that is a dull, monotonous expanse of uninteresting matter.

Aim to secure atmospheric effects, by choosing scenes in which the stronger tones are in the foreground with a gradual diminishing of dark tones as your eye travels

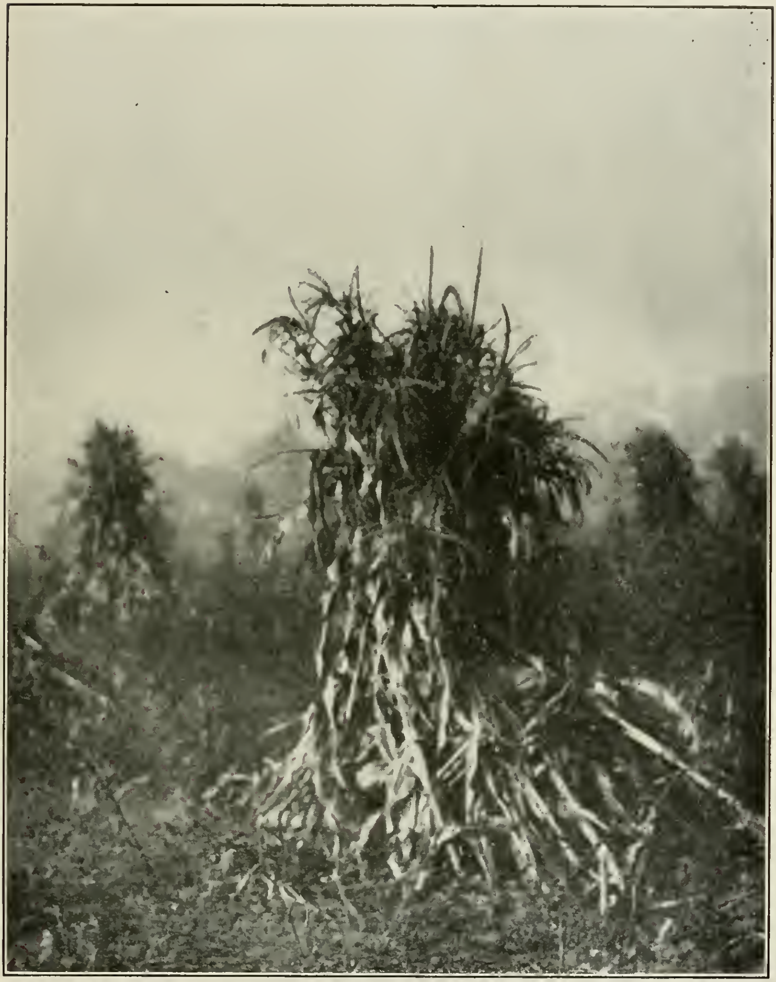

Fig. 107

In Days of Autumn—Illustrating atmosphere as one of the important factors in landscape photography into the distance; or by taking pictures on misty or hazy days.

Be sure to expose amply for the foreground, and in developing, stop *before the highlights are too black.*

Your pictures must have a principal object of interest to which all other parts are subordinate. It may be a sunlit field, or a lake as seen through an arch of trees. It may be a house at the end of a winding road. It may be a human figure engaged in some common occupation; or it may be merely a tree; and in order to complete the composition, there must be some other object of no particular interest except to serve as a balance of the principal object. This object may be anything further away or even nearer, such as the frame of the "sunlit field" vista; or the road itself in the "house at the end of the road" picture; or a clump of trees in the distance; or a building to balance the figure of the man at work.

Avoid having a horizontal line cutting the picture into halves. The horizon line should be approximately one-third the distance from either the top or the bottom.

Aim to have clouds in open landscapes.

Avoid having two highlights or two deep shadows of equal importance in the same picture, and whenever possible, arrange to have the deepest shadow meet the strongest highlight.

The best time of day to take landscape pictures is from sunrise to ten o'clock in the morning, and from two o'clock till sunset in the afternoon. The shadows

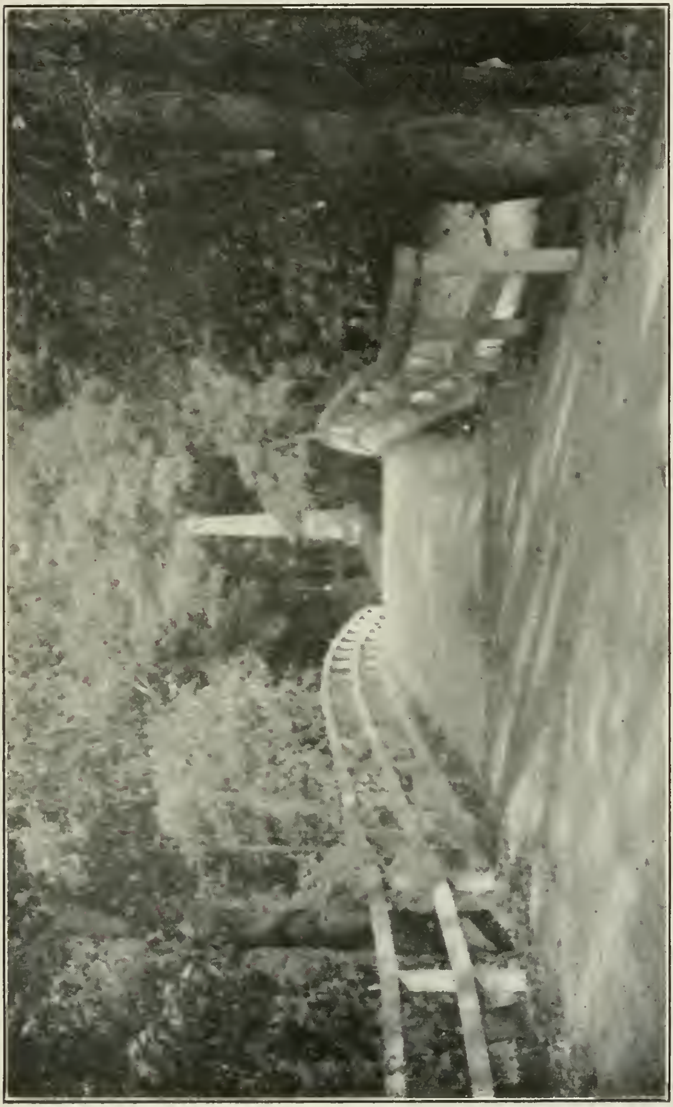

Fig. 108

Concord Bridge—A model of lighting and gradation of tones

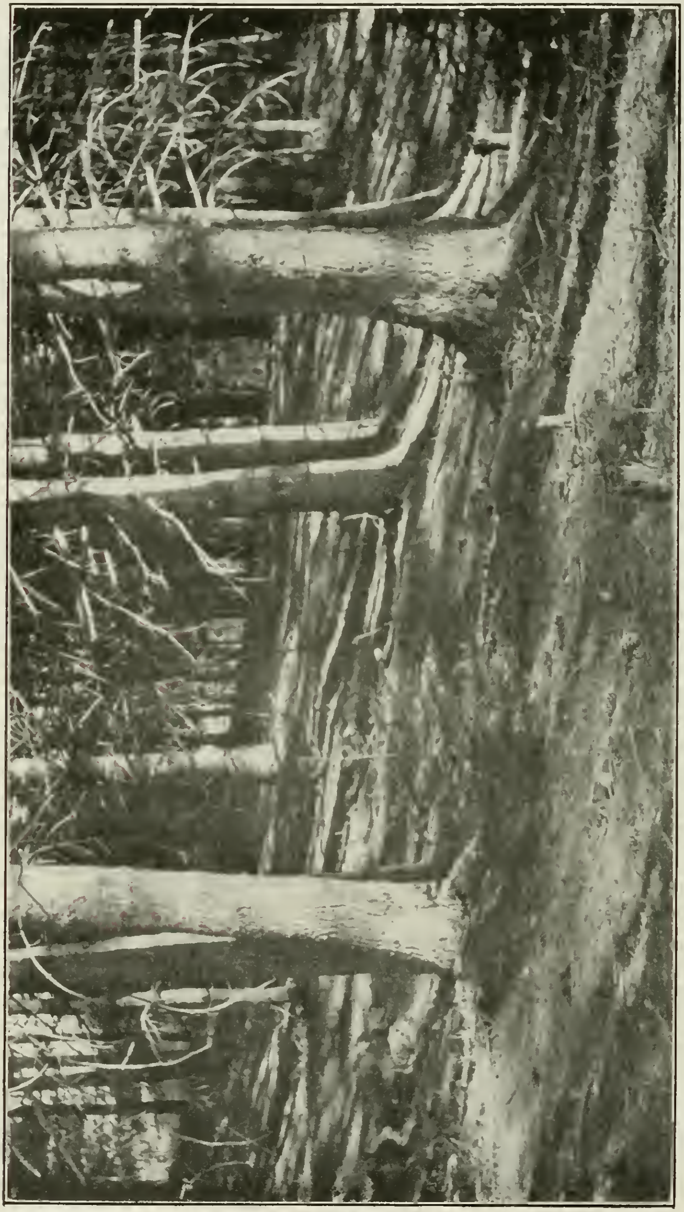

Fig. 109

When Shadows Lengthen—Illustrating the effect of long shadows in landscape work. Taken by *W. R. French* are more in evidence during those hours, and shadows are vital to the success of such pictures.

Never have the principal object plumb in the center of the picture, but instead, somewhat to the right or the left.

Any scene which presents horizontal lines running across the picture parallel to the top and bottom are undesirable, as they obstruct the progress of the eye into the picture. Such lines can be caused by fences, distant shore lines, roadways, etc. If a fence possesses an open gate, or a "let down" pair of bars, it is a different matter entirely, and may be very artistic.

Watch out for bare branches of trees in the foreground unless they are interesting in shape.

Rapid plates tend toward soft effects. Slow plates tend toward contrast, so, in general landscape work, use rapid plates.

Real dark wood scenes with strong highlights are best taken in dull weather, as the general lighting is more even.

For ideal results, develop all plates taken under extremes of light and shadow in soft-working developer. Tank development is the ideal method of developing for softness, as the developer is diluted to such an extent that the process of development is prolonged—action which is decidedly favorable to even development.

In vista work, the frame should not be too interesting, unless it is of principal importance. Choose a time for the exposure when the frame will be a soft mass with some detail; this will be when the sun is at the side or the front.

In gauging light and shadow effects, a sunlit scene when viewed through blue glass can best be judged as to how the various tones will group themselves into masses in the picture itself.

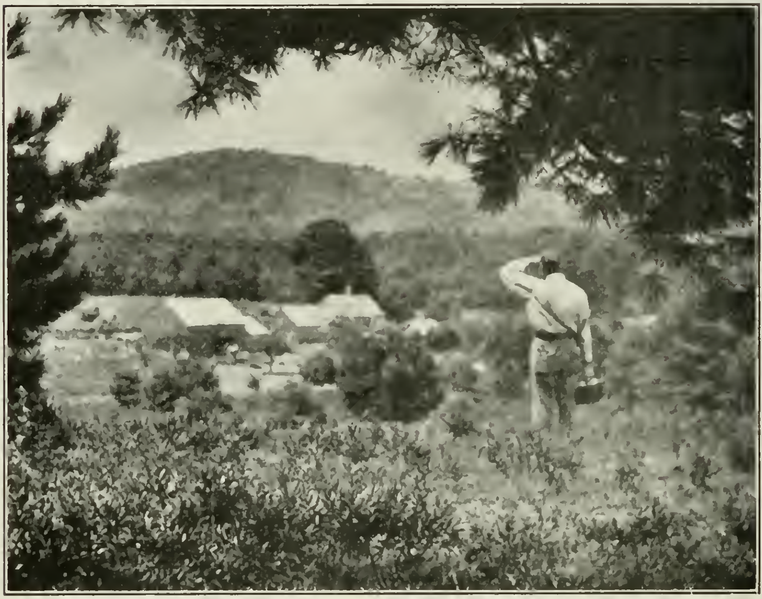

Fig. 110

The Valley Vista—Vista effects are the most popular forms of landscape photography—the themes of many of the world's greatest paintings. By *W. R. French*

In landscape work it is best to use a large stop, for it is not true to nature for the distance to appear sharp like the foreground. In general, F16 is small enough. The darker the background, the sharper the foreground should be in order to aid in the atmospheric effect.

A very important point to bear in mind regarding the securing of balance in pictures made up principally of masses of light and shade is that a mass of heavy shadows or other dark toned material will balance a much larger mass of illuminated space or material; therefore, when photographing street scenes, your camera should be placed nearer the shaded side, so as to include a larger portion of the sunny side. The same is true of landscapes.

WATER PHOTOGRAPHY

Most common to this class are seashore, waterfall, and still surface bodies of water.

1. Seashore Photography

As far as the ordinary beach snapshot is concerned, everything is in your favor. It is when you may wish to make artistic pictures of the sea itself in its varying moods that a few pointers will be helpful.

Over-exposure is the principal thing to avoid. You can do this by using a fast speed, say 1/100 to 1/50 of a second, using a very small stop, unless there are foreground masses present.

In midsummer, the best time of day for picture work is before 9 A. M. and after 4.30 P. M.

When photographing waves close at hand, a large stop will be required, larger than for a more extended view.

For choice of lighting in wave pictures, choose to have the sun at one side or even ahead, and use a lens shade.

In regard to the point of view, the camera should be held low down and pointed at an acute angle to the line of advancing waves.

In case of rocks in the foreground, expose for these rocks, according to light conditions. If waves are breaking over the rocks, snap just as the wave is starting to curl, or you will be too late to catch the break.

Only fresh film or plates should be used, and they should be developed as soon thereafter as possible, because they may become affected and even spoiled by the dampness that almost always prevails at the seashore. Salty dampness is harder on film emulsion than any other kind of dampness. It is well to add that you should be especially careful of your camera, too, when at the seashore, as it is easily affected by the salt, damp atmosphere—the leather and metal parts being subject to corrosion. It should be kept in a dry place, and thoroughly wiped out and off after using it in an atmosphere that is damp enough to deposit moisture on it. If sea water should happen to fall on it, wipe it off just as soon as possible.

Films or plates that are stored must be stored in a dry place, else they will deteriorate.

When photographing beach scenes, don't overlook the fact that the sand and water are strong reflectors of light, therefore keep the lens shaded and cut your exposure judiciously.

2. Waterfalls

Owing to the fact that a waterfall can only be found where a stream runs on bed rock, it is always flanked by a mass of rocks. These rocks, and also the vegetation which may hide them, are dark in tone, and in order to record detail in dark toned objects with a snapshot exposure, it is necessary to make the exposure at a time when the sun is shining on the subject.

Snapshot exposures are recommended for the reason that the chief object of interest in such subjects is the falling water, and the sharpest image that can be secured will represent this more realistically than the blurred image which a time exposure will produce.

A waterfall on which the sun is shining is as easy to photograph as an ordinary landscape, but you should remember that a slight change in viewpoint makes a greater difference in the appearance of the lights and shadows on falling water than in the lights and shadows on a landscape.

Sparkling lights can best be recorded when the sun is shining diagonally across or nearly straight downward on the falling water. The sun must be in front of and not behind the camera.

When the waterfall is in such poor light that a time exposure is necessary, a rapid succession of short exposures will give better results than a single exposure equal in length to the sum of shorter ones. For instance, if 1/5 is considered correct, it will be better to give 10 rapid snaps of 1/50 each, than to allow the shutter to remain open for 1/5 of a second.

Still-Surface Waters

Very seldom do beginners make pleasing pictures of expansive stretches of still water, the reason being that "ortho" plates and light filters are necessary in order to properly register the color values as they exist in the sky and water. In their prints the water usually appears as a white expanse, and wholly devoid of any character. Personally, before I made a study of the subject, I wasted dozens of plates in trying to do the impossible, that is, make pictures of what appeared to be most beautiful vistas through frames of trees across still water, or rough for that matter, in which the sky

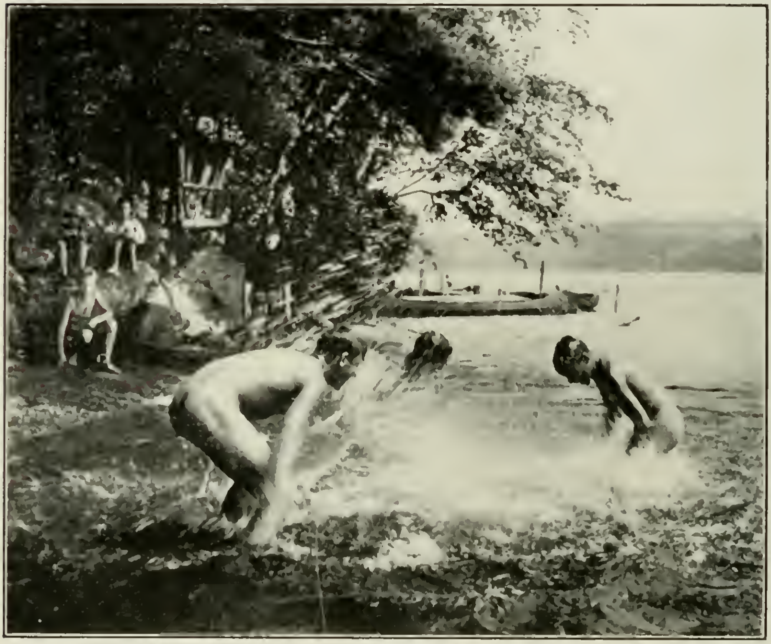

Fig. 111

Fun in Camp—The disturbed water possesses character, while the still water does not was reflected as a clear, white expanse. The use of "ortho" plates and filters would have helped matters, but after all, such subjects are not worth the attempt except under such conditions as cloud-filled skies; or sunset pictures; or fake moonlights; or where the water is, in good part, shaded by trees or mountains, so that the water surface possesses some tone except white.

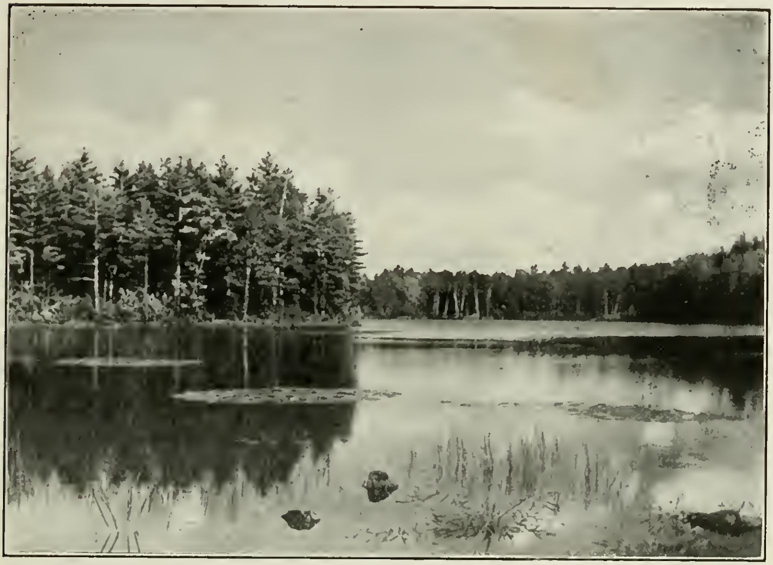

Fig. 112

Summer Calm—Water with character, not only from reflections of trees and clouds, but also from reflections of the blue sky which is properly rendered by the use of an orthonon plate and color screen

When the water is disturbed enough to have character, and when but a small portion of it is to be included, well filled with reflections, very pleasing pictures can be made.

The two pictures, Figures 111 and 112, clearly demonstrate my point. Figure 111 is the type to which I first referred, and Figure 112 illustrates the ideal method of securing inland water pictures. There is character in such water. Such results can always be secured by properly selecting the viewpoint.

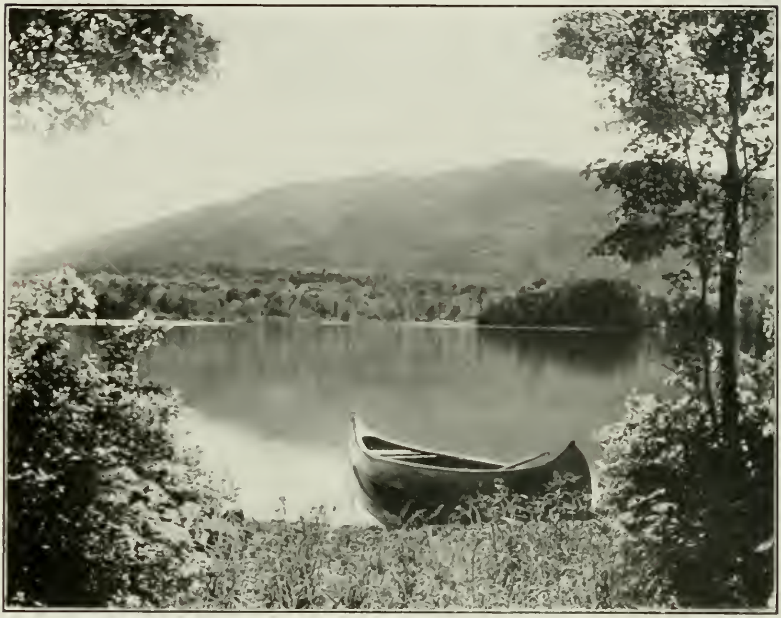

Fig. 113

Where the Lake Smiles Back at the Mountain—An example of Orthochromatic photography

As a final caution, *don't overdevelop* water pictures. If anything, slightly over-expose and under-develop.

SNOW PHOTOGRAPHY

Snow photography is one of the most fascinating branches of the photographic art, provided you are not afraid of cold finger tips, and will carefully study your exposures.

One pleasing feature of winter photography is that you can find interesting material almost anywhere, especially after a fall of clean, white snow, with the sun shining brightly upon it. Without sunshine it is hardly worth while to try for pleasing snow pictures, for without sunlight and shadows the snow is devoid of detail and the picture will be lifeless and possess no snap.

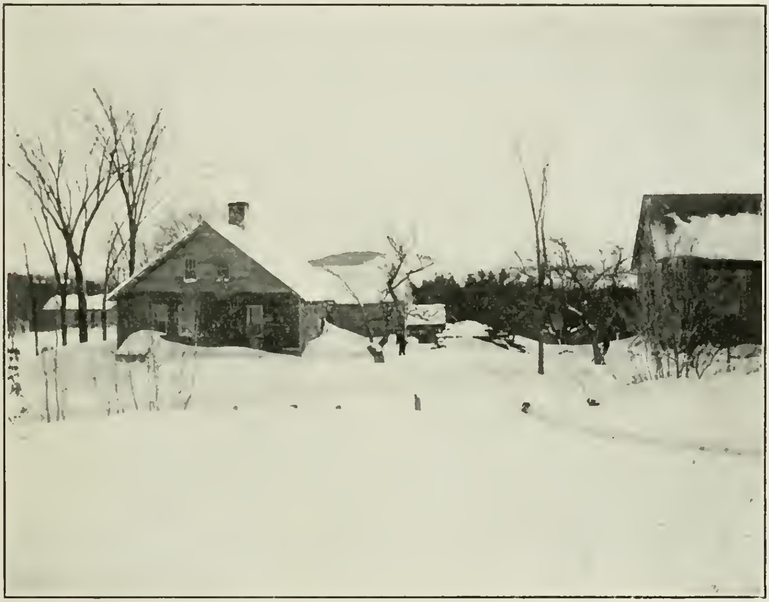

Fig. 114

Nearly Snowbound—Shadowless foregrounds as well as blank white skies in snow pictures are uninteresting

In snow photography you must select such a view point that the sun casts shadows that are visible to the camera lens, therefore mid-forenoon, or mid-afternoon is the appropriate time of day.

Such subjects as shovelled-out paths; country roads newly broken out; trails through the open fields, or the woodlots; winter sports; brooks lined with snowy banks; half-buried fences, etc., are excellent subjects.

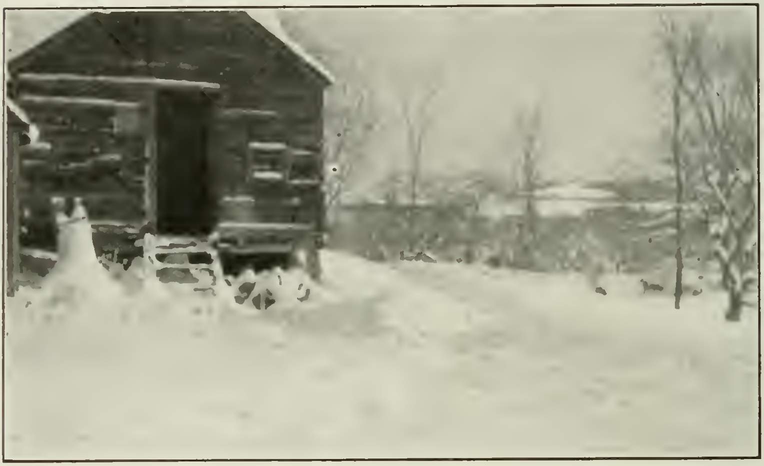

Fig. 115

After the Snow King's Visit—Skies with quality and foregrounds with shadows make real snow pictures. Taken by *W. R. French*

In addition to sunlight there are several other essential features of snow photography that you should observe, principally among which is the urgency of securing detail and sharpness in the immediate foreground. Chalky-white foregrounds are absolutely lacking in pictorial qualities, therefore if no detail-producing features already exist, make them by breaking a path, or by putting footprints in the snow before the picture is made.

In the winter time, with the ground covered with snow, you will observe that the sky is of a darker tone than the snowscape, therefore it should be so recorded in the picture. Correct exposure and development, even without "ortho" plates and filters, will enable you to secure the desired effect, especially if you will print the sky a trifle darker by shading when you make the print. But with "ortho" plates and filters, or with a sky filter and films, you will be most agreeably surprised

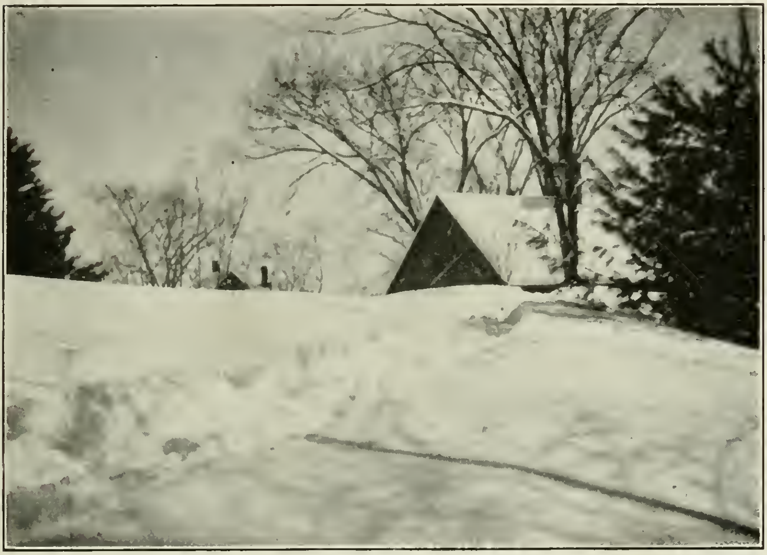

Fig. 116

The Trail Homeward—Snow trails are always interesting and can be made to fit any composition. They should always lead from the base of the picture rather than from the side. Taken by *W. R. French* because of the gradations which will appear in your negatives.

If you are using films only, by all means get a Kodak Sky Filter and use it. Be careful to place it over the lens so that the yellow part is at the bottom.

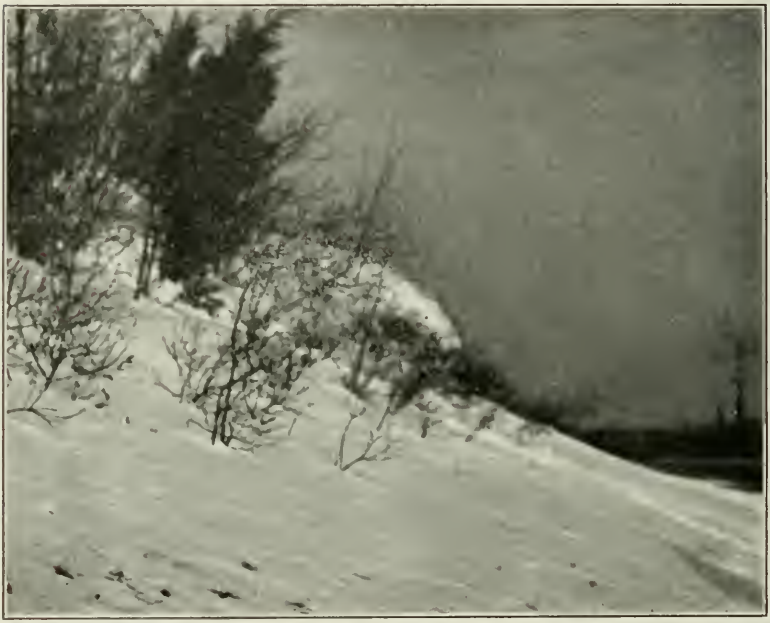

Fig. 117

Snow Crowned—When there are no clouds in a snow picture negative it is well to print the sky a trifle longer in order to give it a tone a shade darker than the snowscape

The exposure for snow scenes, like the exposure for summer scenes, depends on the contrasts between the lights and shades of the subject; but in snow scenes where it is the detail in the snow that we desire to get, rather than detail in the other features of the subject, the exposure should be made for the highlights rather than for the shadows, for usually there will be enough reflected light present to sufficiently illuminate the few shadows that exist.

For all ordinary, well-lighted snow scenes, 1/25 at F 16 is ample exposure, unless a light filter is being used. Even a slight over-exposure of snow subjects will cause fog on the film, from reflected light. Because of the reflecting power of snow it is advisable to use a lens shade, irrespective of the position of the sun.

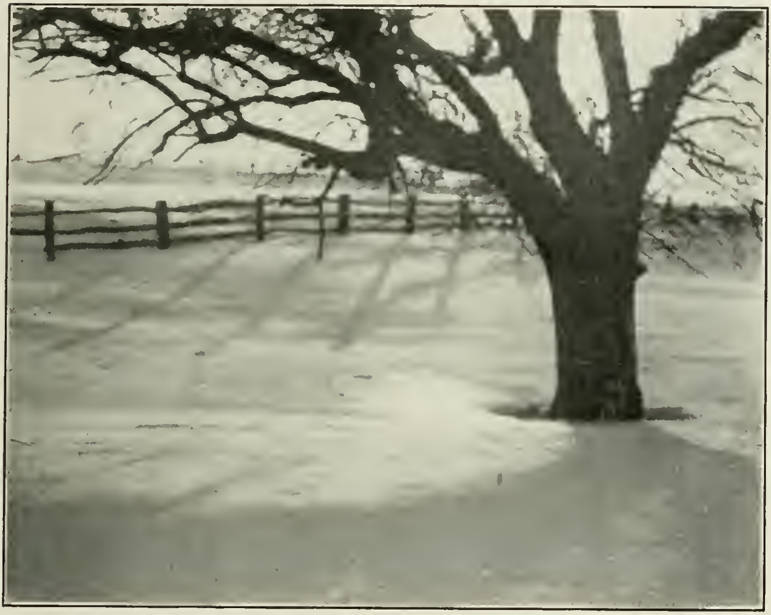

Fig. 118

Winter Scene—A wealth of possibilities is offered in winter for producing beautiful foreground pictures. With the sun ahead and the lens shaded from it you have an ideal combination with which to work

In developing snow plates, the same precaution must be used that is used when developing open water scenes. Over-development is a dangerous thing, and yet, development should be carried a trifle longer than normal, in order to give enough density to produce white snow.

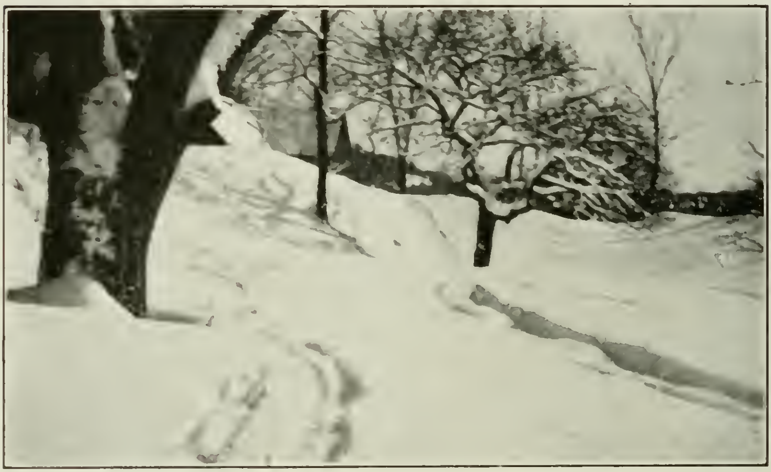

Fig. 119

Snow Trails—Too many trails. This picture could well be divided in two.
By *Oscar Perry*

A developer diluted one-third with water, and of proper temperature, 65 degrees Fahrenheit, should be used.

Never develop the negatives when they are chilled, or they will come out flat.

Flower Photography

Flower photography very seldom finds a warm spot in the heart of the beginner, mainly because his equipment is not designed for such close-up work as the process requires,—surely, it is not a lack of interest in this phase of nature that holds him back.

For him who does develop a hobby for flower pictures there is a wide field of action, and besides, such a hobby is both recreational and educational.

Flowers possess many colors, and many shades of the same color, therefore the first requisite for good flower values are orthochromatic, or even panchromatic plates and a deep yellow filter.

For flowers that are globular or cup-shaped, like the Iris, the Lily, the Rose, the Lady Slipper, etc., it is best to use a cheesecloth screen on sunny days, as a filter for the sunlight which falls on the flower. By so diffusing the light, ample detail can be secured in the shadows. Such flowers are sometimes better taken on cloudy days.

Flowers that have flat disc-shaped heads like the daisy, the aster, and the wild carrot, can be effectively photographed in bright sunlight, because there are no deep shadows to illuminate.

The sun should be at the side in order to show the shape of the flower, for if it is behind the camera, no shadows will show, and therefore no roundness.

In order to sharply focus all parts of a group of flowers you must stop the lens down to U. S. 32, or F22, and very carefully study your exposure guide to determine the appropriate exposure. Ordinarily, for flowers in the sun and without a filter, an exposure of 1/5 to 1/2 second will be required with the stop given, but if the day is cloudy, about four times this exposure will be necessary.

When the diffusing screen is used, but no filter, an exposure of 1/5 to 1 second will be needed.

In general, for red, purple, or other dark colored flowers, the exposure should be twice as long as for those that are blue or light colored.

Fig. 120

A Happy Boy—One of the fleeting expressions worth capturing

It is probably unnecessary for me to add that natural settings should be selected, in preference to artificial.

There is a reward in hunting for wild flowers with a camera, in the exhilarating influence of long hikes; in the study and knowledge of nature; and in the production of scientifically valuable and pretty pictures.

Child Photography

The crowning virtue of the camera is the power which it gives us of making a complete picture history of the lives of our little ones. And it matters not whether we are real skillful operators, or not, for almost anyone can aim a camera and snap it, and that's about all that is necessary in ordinary picture work with children under good light conditions, for the pictures which show them in their almost endless variety of natural poses at play are the kind that we treasure most. Nevertheless, if our pictures of the "tots" can be so made that they portray the many fleeting expressions of joy, animation, curiosity, etc., we feel prouder of our skill, and that is just what we should aim for.

Now as to the fundamentals which should be mastered in order to attain success as a maker of children's pictures, study well and practice those mentioned here.

We will consider the subject under two headings: Unposed, and Posed. The difficulty of securing unposed pictures of the "kiddies" is that a good part of their play and other busy moments take place under conditions which are unfavorable for snapshots. A Graflex is a good solution of the problem, but we are considering the slower types of cameras just now, so we must confine our remarks to that phase of the work.

The best practice to follow is to have your camera constantly loaded, and whenever you spot the youngsters occupied under favorable light conditions, amble out to them, and make the exposure at the propitious moment.

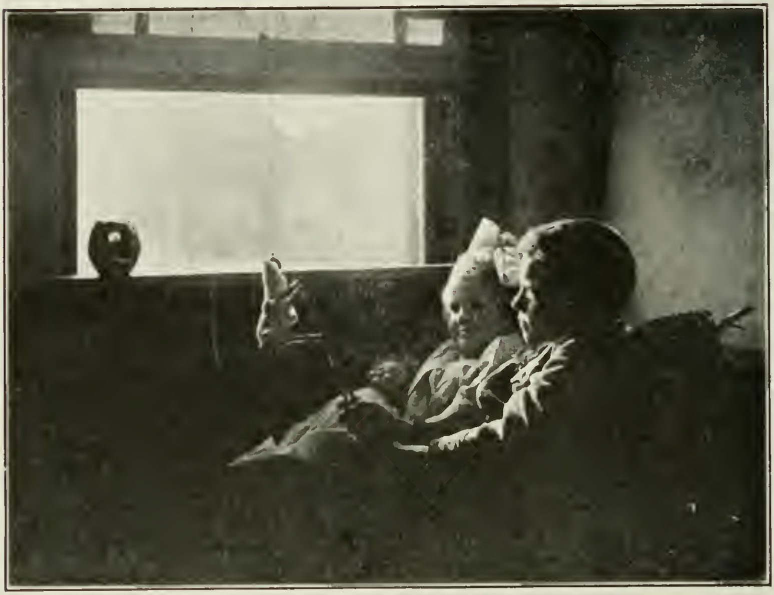

Fig. 121

A Jolly Party—Another of the fleeting expressions that we cherish. Under such circumstances, it matters not if the shadows are blocked. The picture is worth while

Ofttimes the particular location where they are engaged does not please you, so in order to secure more favorable backgrounds, you will find it quite a simple matter to lure them to the spot which you may select, and when they are again oblivious of your plans, make the snap.

When making such record pictures, the background is not as important, nearly, as the pose of the subjects, but in general, it is just as well to avoid including distracting backgrounds, such as the wash on the line; the clapboards on the house or barn; the picket fence, etc.

Posing children for pictures is an art in itself, but it can be done if you possess a liberal amount of patience and self-control,—qualities of disposition which are particularly vital when trying to make good exposures of the baby. My own special method of posing "kiddies" for pictures is to place them in as strong a diffused light as possible, and to then interest them to the point of performing whatever I happen to have in mind. Then I set my camera and wait for the propitious moment for the 1/5 or the 1/2 of a second exposure. If, meanwhile, they move out of their place, I invent some method of getting them back to the position where I want them.

Very often I am able to secure the pose which I want, and when all ready to push the button, suddenly attract their attention to the camera. The momentary pause which occurs as soon as their attention is so secured, is all that is necessary.

Often, when I aspire to catch some particular expression, I persuade the subject to repeat after me some remark which will bring to its face the coveted expression. For instance, having the child repeat after me, "Gee whiz, this candy is good," or "Hello, Pop," or "Poor Dollie," or "Papa, give me a piece of candy," is

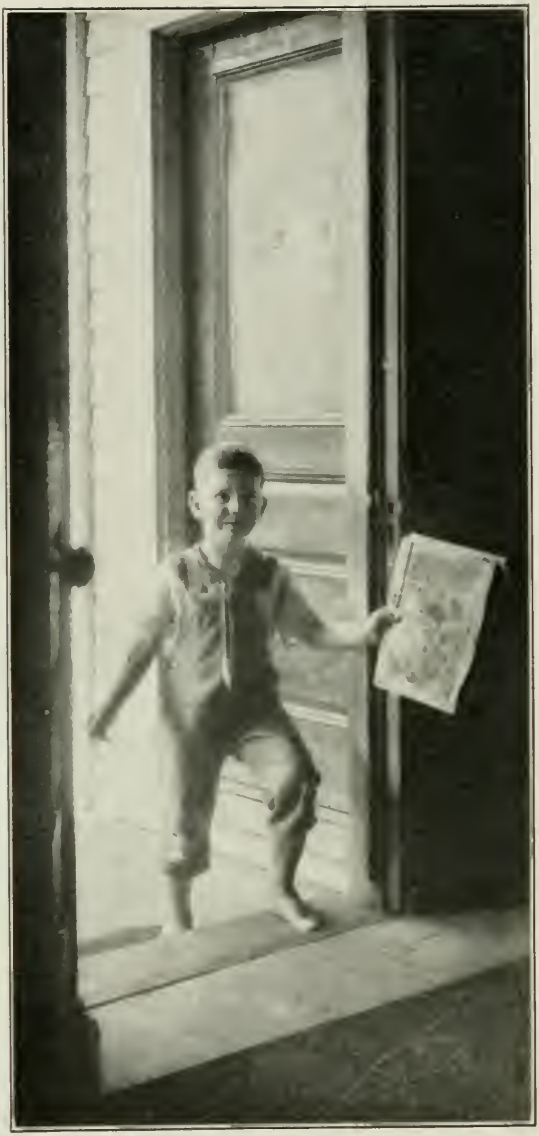

Fig. 122

"The Funny Paper Has Come!"—Another planned picture in which the boy really made the remarks in the title and the exposure of 1/5 second made just as he said "come." Such a picture records a weekly occurrence of the boy's childhood and is one that will be cherished in after years.

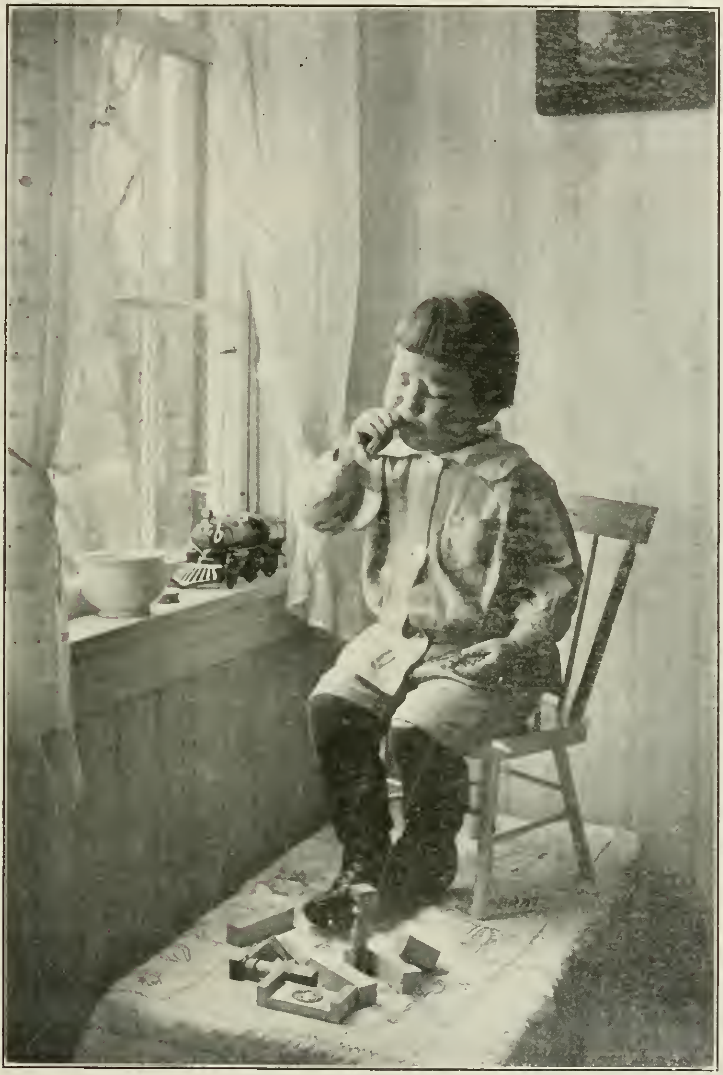

Fig. 123

Bubbles—A posed picture and not at all difficult to take, as the child is interested sure to bring to the face of the subject the expression that is wanted.

A study of the accompanying pictures will serve to illustrate the points that I have endeavored to present to you.

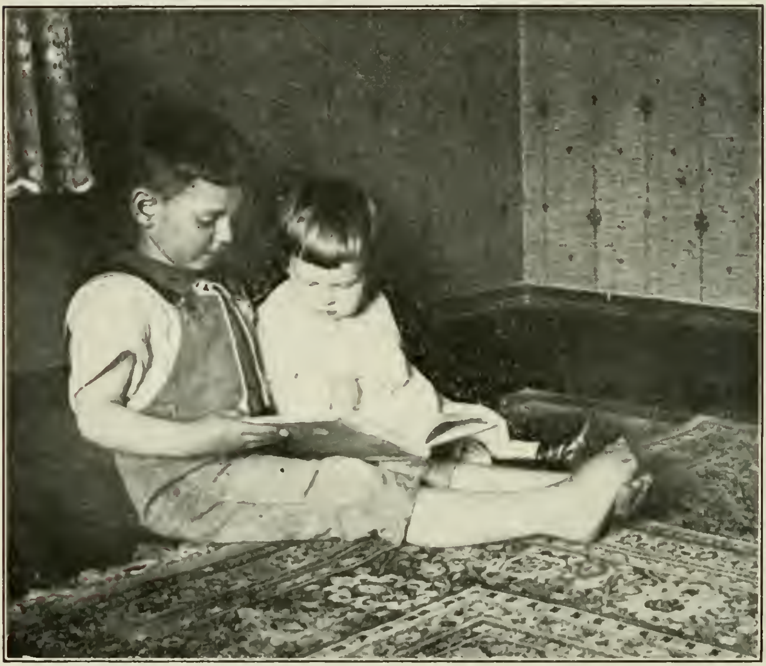

Fig. 124

Pretty Pictures—Partly posed—at least as far as working up an interest was concerned, but snapped when they were unaware. Given 1/5 second at F6.3

Pictures of the children which tell stories are the kind which offer the strongest appeal to lovers of children, and it makes no difference whether the picture is, in good part, posed, or not, as long as we don't make the exposure until the subject forgets that it is posing, we shall be satisfied with the result.

The best story-telling pictures are those in which the surroundings harmonize with the theme of the story, even though they may be distracting.

You will note that from what has been said it is possible to have the subject gazing at the camera without destroying the story-telling merits of the picture. When articles tell you that you should avoid having children gaze at the camera, the "dope" which they mean to give you is that the pose should not be made on the "see the little birdie" plan which results in molding the child's face into an expression of curiosity, pure and simple.

If you are clever at devising methods of attracting the interest of the baby, you can make good pictures of it, even indoors, provided you place it in a well illuminated section of the room. One of the best pictures that it has been my good fortune to make of a one-year old tot was made easy by fastening a Dennison sticker to one of its "big toes," and while it was pudging away at the obstinate thing, trying to dislodge it, I made the exposure. Another easy way to get the baby's picture is to place it close to the window while someone attracts its attention from the outside. And still another method is to place it in a strong light, with a plaything, and suddenly attract its attention towards the camera. If it is reluctant to "stay put," give it something brightly colored, but too heavy for it to lift from the floor, then try again.

Let me make one or two more offerings before clos-

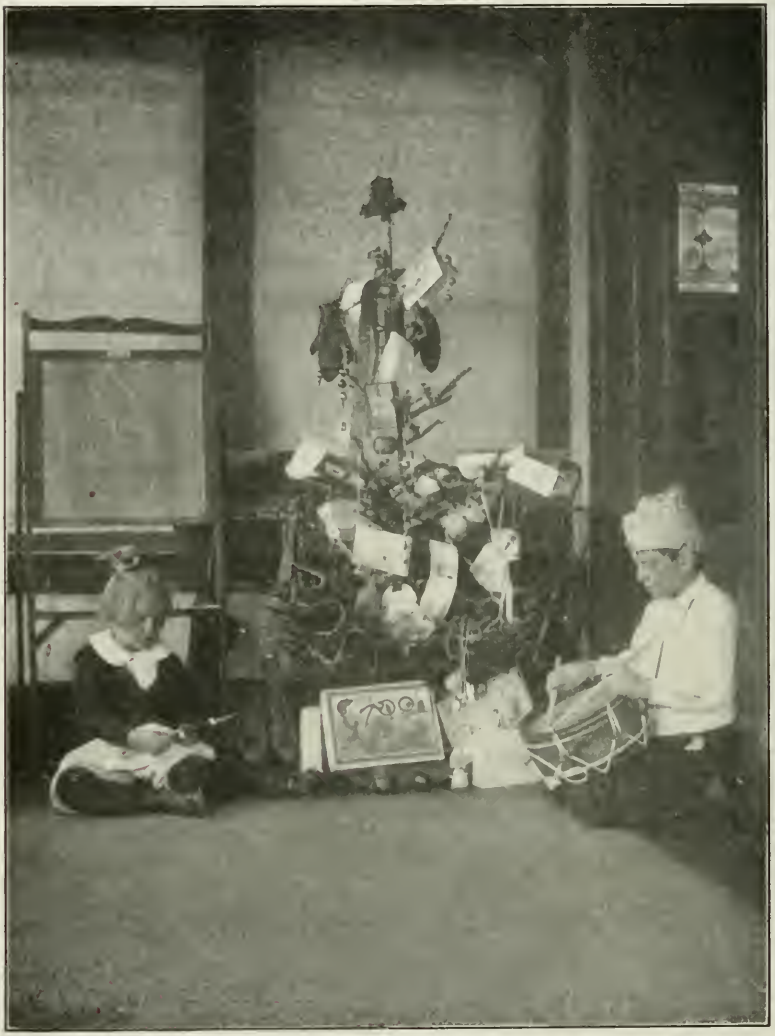

Fig. 125

Merry Christmas Time—An example of rather poor posing, as the tots seem self-conscious. Two seconds exposure made it necessary for them to hold still, a tough proposition for live youngsters ing this subject, and that is in regard to snapping action-pictures; lighting, and dress.

Unless your camera is equipped with a shutter speed faster than 1/100 of a second, you should not attempt to snap children in rapid action involving motions made at right angles to the lens. If you want pictures of the tots while they are running, snap them when they are moving towards or away from the lens.

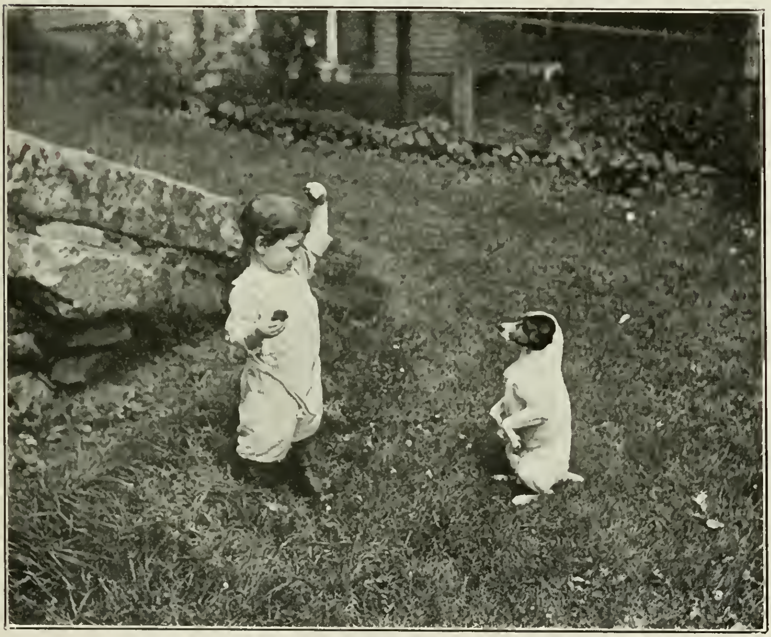

Fig. 126
The Young Master—A picture caught at the opportune moment with only a box camera

Out of door lighting in sunlight is at its best either before 10 A. M. or after 2 P. M., for it is not so harsh at those times and the shadows are more pleasing.

As for dress, children are always at their best when attired in their everyday "duds," particularly when at their play; and it matters not whether Donald's hair is parted just so, or whether Barbara's ribbon is somewhat mussed-up;—get them as they look most natural.

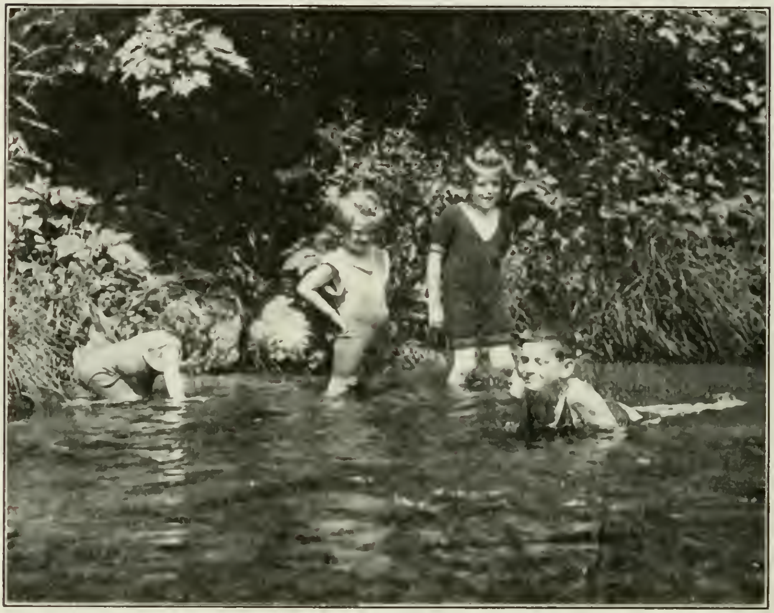

Fig. 127

The Stunt—A picture, posed as to composition, but caught when they were unaware

Just one more thought—keep a special album of your children's pictures, arranged according to the order in which they were made; then you will possess a chronological series of pictures of their development.

Architectural Photography

In straight architectural work full detail is essential, and in most cases entails the use of small stops, and time exposures.

Your camera must be absolutely level to avoid distortion, and intelligent use must be made of the "rising and falling front," and of the "swingback" attachment of the camera.

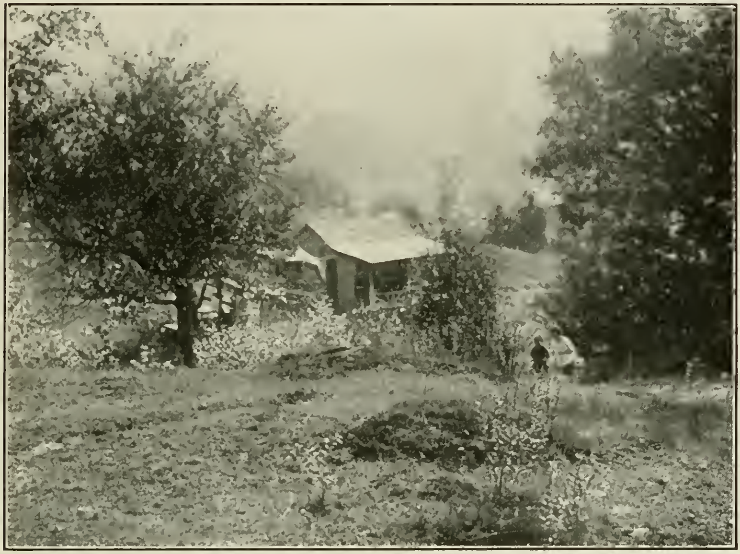

Fig. 128

Cornidell Camp—A simple architectural subject possessing good aerial perspective

In every architectural picture the first and most necessary requisite is perfect perspective.

Perspective is of two kinds: Aerial and Linear.

Aerial Perspective in picture work is the art of producing effects which give the idea of distance by means of different planes of atmospheric quality, as a result of which, sharpness of detail diminishes as the eye travels into the picture.

Linear Perspective is the art of representing objects on a plane surface by means of lines so that the picture will present the same appearance as the object itself when viewed from one and the same point.

It is delightful to chum with the flowers when we have our camera along—in the home garden, in the open fields, or away off somewhere in the quiet woodland.

The ideal camera for this spot is the view camera with a long bellows, although a small folding camera, equipped with a Kodak Portrait Attachment meets the need very effectively, provided a tripod is used.

If you are keen for making a specialty of flower photography, you should secure a complete book on the subject, because there is a lot to be said on it. If,

Linear perspective as related to the lines of high buildings, although not displeasing to the eye, when we look at it, is very displeasing in pictures, if not registered correctly. It is quite expedient that the camera be adjusted so that the perpendicular lines of the building shall be parallel to the sides of the picture, and therefore perpendicular to the base, just as they really are in actuality. This effect is produced by adjusting the "swing-back" on the camera, i. e., placing it so that it is perpendicular to the surface of the earth.

Pictures of houses should be made so that more than

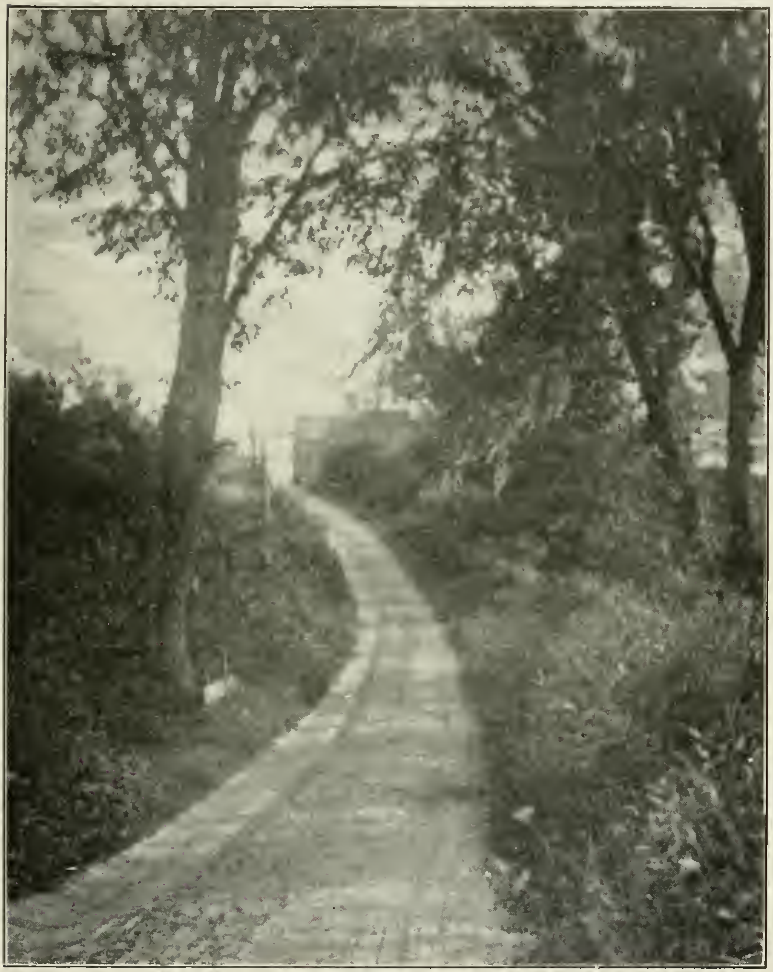

Fig. 129

Over the Hill and Far Away—An excellent example of Linear Perspective one side shows, and preferably when one side is in the shadow. Plenty of foreground, if interesting, should be included so that the building sets well back in the picture. It is also advisable to avoid filling the picture space with the picture only.

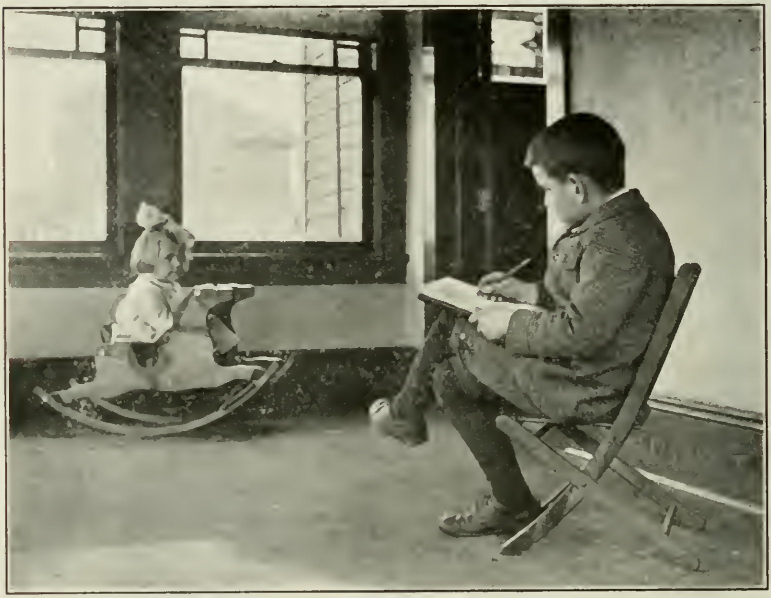

Fig. 130

Riding Hobbies—In interior architectural work as well as in exteriors it is important to render vertical lines as such

Proper lighting is a vital factor in successful architectural photography, ofttimes the difference of a few minutes being enough to alter, entirely, the play of light and shadow, upon a bright day. In fact, lighting is so important that many of the most successful pictures have been created from what the majority of people would consider very commonplace subjects.

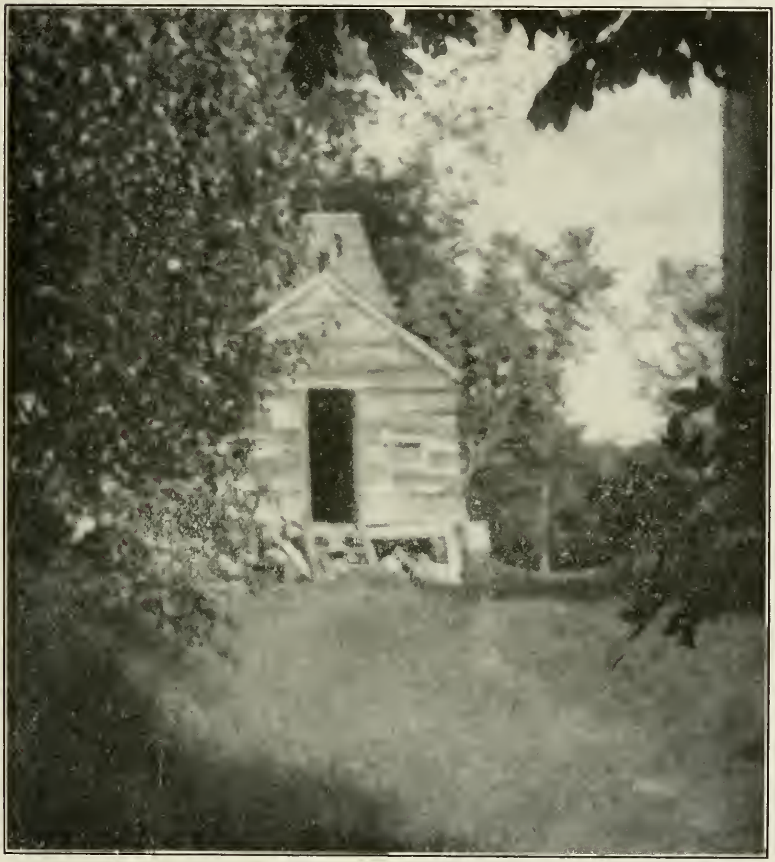

Fig. 131
Rural Simplicity—A simple everyday bit of architecture made pleasing by proper lighting and point of view

Always employ orthochromatic plates, if you are after the most artistic results, preferably double-coated or backed, and use in combination with them a ray filter.

When possible, choose a sunshiny day when the sky is filled with clouds.

Avoid having figures in the immediate foreground, staring into the camera, but don't hesitate to introduce figures of people, or animals, if they can be placed far enough from the camera to avoid attracting attention to themselves instead of to the building, which is the object of most importance in the particular instance.

Night Photography

It is a simple matter to make pictures by electric light, especially when the ground is covered with snow. Naturally, the exposure must needs be prolonged, a scene illuminated by an ordinary street light requiring 20 minutes or more at stop F16, but you must not expect to secure detail in surrounding objects, except on the lighted side.

Whenever photographing streets, store windows, etc., by electric light, avoid, as much as possible, including the light itself in the picture, as it will appear as a big ball of white light, despite double-coated or backed plates.

Photographs may actually be taken by moonlight, by giving sufficient exposure, but such views do not differ a whole lot from those taken by daylight. The fun of rambling off into the open on a bright moonlight night is, however, well worth the time and money spent, especially if the air is not too biting cold, and there is a light fall of clean white snow everywhere. Off in the country is the ideal place for such searches after the picturesque, because there the snow is apt to be pure white, and there are plenty of walls and fences around, which go a long way towards making artistic pictures. Such subjects, in full moonlight require an exposure of 25 minutes at stop U. S. 4, or F.8. While one plate is being exposed you can be searching for other settings—it is great fun!

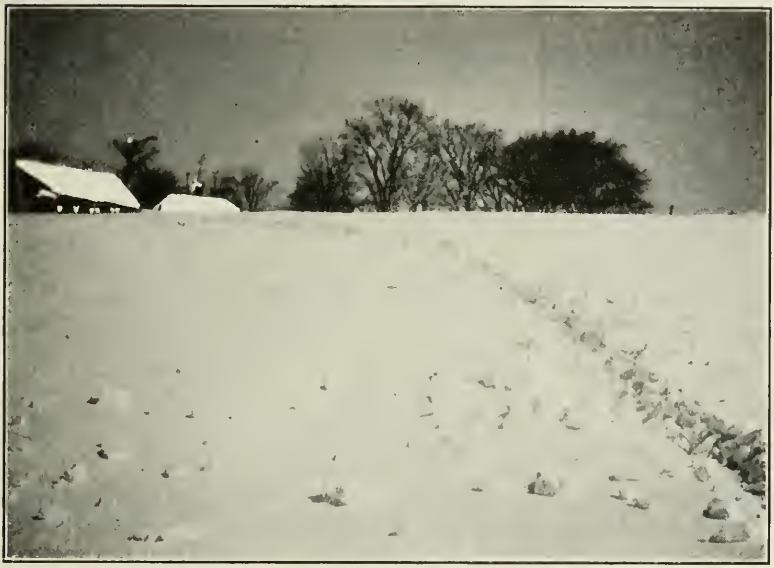

Fig. 132

The Trail to Poor Man's Rest—Taken by moonlight, 25 min. at U.S. 8 R. R. Lens

Many so-called moonlight views are taken in the daytime. Views on lakes and rivers with the sunlight coming from behind the clouds, and with a glimmering reflection on the water, are the most popular settings for imitation moonlight pictures. Such views are made either early in the morning, or late in the afternoon, and in such picture work the camera is pointed directly at the place in the sky where the sun is either in hiding or peeping out from behind a curtain of clouds.

An exposure of 1/25 at U. S. 16 is ample, for it is expedient that the exposure be under rather than over. Such plates should be developed for softness, therefore beware of over-developing.

Flashlight Photography

The attractive feature of flashlight photography is that it enables us to make interior pictures under conditions that are impossible by daylight. The difficulties attending the photographing of children in poorly lighted rooms is entirely eliminated by the development of this phase of the art of photography; in fact it is quite a simple matter to make portraits by the flashlight process.

The two most common forms in which flashlight is used by amateurs is the Eastman Flash Sheet and the Eastman Spreader Flash Cartridge, but as one becomes more versed in the handling of these preparations, it is not at all difficult to use the powder in loose form, and thus be able to so arrange, as to include himself in the pictures which he, himself, takes.

The principle of the flashlight is that it gives an illumination equal to that of daylight, and in such a

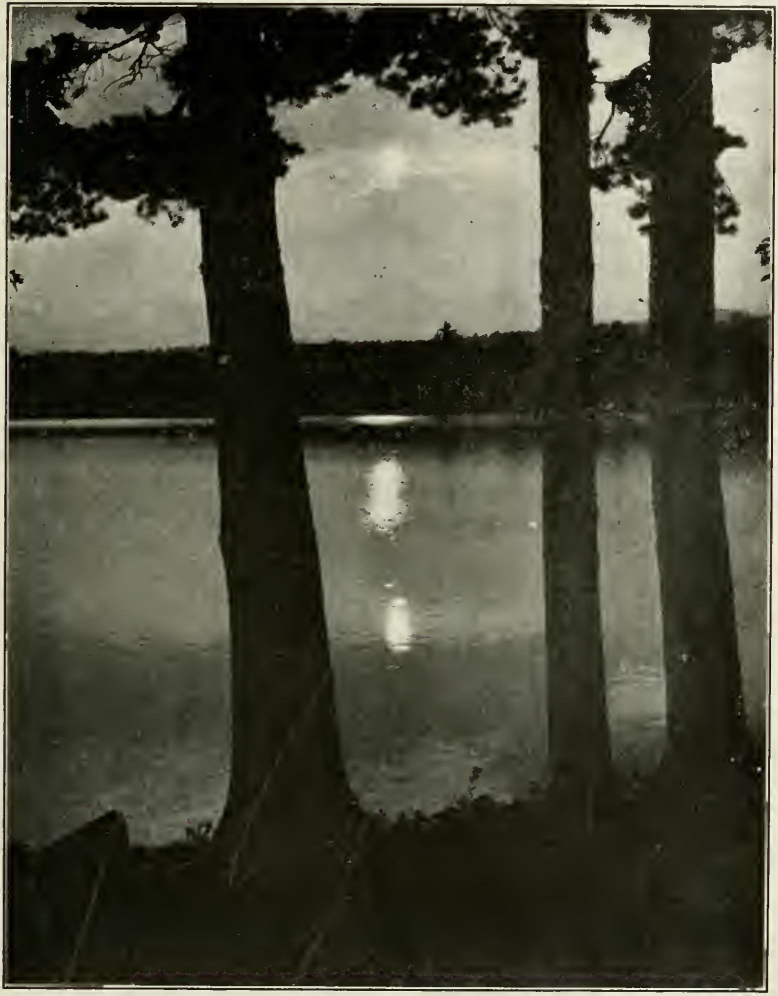

Fig. 133

By the Light of the Moon—Picture taken in the afternoon near sundown, by *W. R. French* brief duration of time that objects in motion can be photographed without a visible blur.

Another advantage is that we can direct the light to fall absolutely in the desired place, by properly placing the flash so that the rays of light will proceed in any direction.

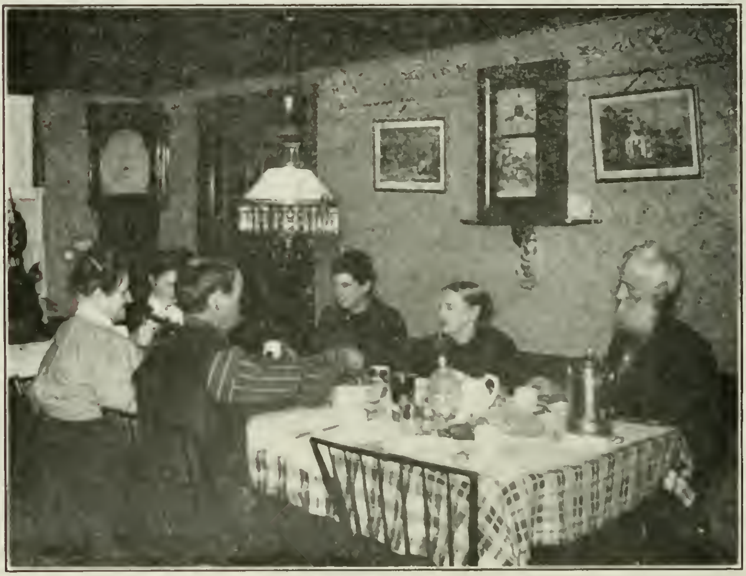

Fig. 134
The Family Board—A flashlight picture. Flashlight is a wonderful medium for recording home scenes indoors

Flash sheets are recommended for interior lighting where there are no human figures that are apt to move, as they are not instantly consumed like the powder, but instead, burn for about a second.

The flash sheet can be pinned to strips of wood which are fastened to the back of a chair and thus made convenient for moving to any part of the room, or the Kodak Flash Sheet Holder can be employed.

If a board is used it should be at least one foot wide and eight feet long and fastened to the chair in an upright position. If one is doing considerable of such work, it is well to fasten some kind of base to the board so that it will stand without being fastened to any other support.

The ideal arrangement for igniting the sheet is to bore a one-inch hole through the board, six feet or so from the floor, and to so arrange the flash sheet that its center is directly over the hole. With the thumb, pinch a ragged hole through the sheet so that the broken edges project into the hole in the board. Ignite the sheet with a match from the back of the board, by touching it to the ragged edges of the break in the sheet.

The advantage of the sheet holder is that it can be held in one hand at any height in the room, and as it has a white fire-proof lining, it acts as a reflector, and will increase the strength of the light.

When using flash light cartridges, be sure to follow directions carefully, as the contents are highly inflammable; and be sure that it is not ignited near lace curtains, or any other inflammable material.

There are several devices to be used in connection with flash light cartridges, most common among which are flash light guns. These devices are so constructed that by pulling a wire with one finger a spring is released which comes in contact with a paper cap, thus igniting it and the cartridge itself.

Taking the Flashlight Picture

Leave all lights burning in the room which are not within the field of view of the lens, as this will prevent the dilation of the pupils of the eyes of the subject, and will also prevent the stare so often in evidence in flash light pictures.

Now select the place for your camera, and focus it. If you are using a stand-camera, and find difficulty in focusing on the ground glass, have someone hold a flash lamp, or light of some kind in the center of the picture space to be taken. Then set your flashlight apparatus wherever you desire, but not inside the limits of the picture. It should be about three feet higher than the head of the subject in order to give correct modeling of the features, and to give the desired softness, i.e. for all ordinary subjects, debarring those with wide hats, deep, set eyes, etc.

If your subject is a room in which children are at play, in fact if it is anything except a bust picture, insert your plateholder, draw the slide, and ignite the flash, making sure first that your lens is open and that you have cautioned those present against gazing at the flash.

If the subject is in the nature of a portrait or group, a reflecting arrangement should be used that will somewhat eliminate the shadow side of the face or faces, and for softening contrasts in general, that is, provided the flash is at one side, and not near the camera, in which latter case, the lighting will be too even or flat. Aim for shadows just as you would if out of doors, but not for contrasts—the reflector will prevent this tendency.

For a bust portrait, with the subject seated, a white towel fastened over the back of a high backed chair will do. The reflector should be a little forward of the sitter and somewhat higher than the face.

To diffuse and soften the flash, or rather the light from it, when portraits are being made, place a screen of cheesecloth a yard square between the flash and the sitter, about two feet from the flash.

Be sure to close your shutter as soon as the flash is made!

In order to get into the picture yourself, try this method:

Rig up a contrivance for holding the flash, by placing a wooden box, say two feet long, one foot wide, and six inches or so deep, on a table, piled with books, etc., so as to bring the box to the required height. Have the open side of the box face the center of the picture space so that the bottom of it will serve as a reflector of the rays from the flash—the upper side of the box should be removed previous to operations in order not to confine the flash too closely.

Pull a tuft of absorbent cotton into a fuse eight inches long and about the diameter of a lead pencil. Roll it so that it won't be fuzzy, and lay it on the lower side of the box so that one end is well back, and the other slightly projecting over the edge of the box. Empty the flash cartridge on the inner end of the fuse. Make the necessary camera adjustments; select the place which you are to fill in the picture; ignite the fuse and scamper into your position.

In college it was my good fortune to act as official flash light photographer, and on some occasions I would actually cover the length of a large hall or gymnasium in time to settle myself before the flash—often much to the amusement of the "bunch."

The possibilities of picture work with flash light powder are legion and too many to take up in detail here. I will run over a few more matters that need attention when flash lights are to be made, and then leave the subject in your hands.

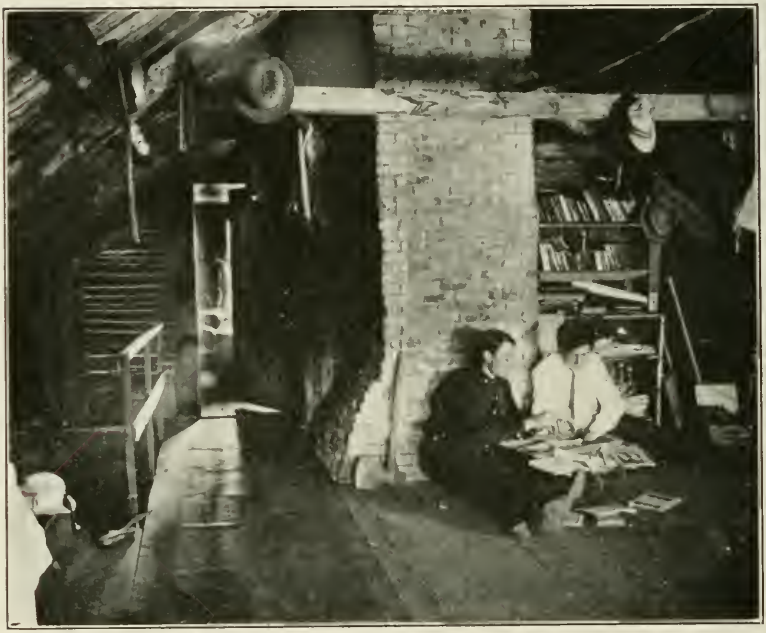

Fig. 135

Old Treasures—With flashlight, pictures can be made in the darkest of places. Here the operator, himself, got into the picture

The question as to how much powder to use for different subjects is one that can not be specifically given here, as the size and color of the room; the color of the subject in the room; the distance of the light from the subject, etc., can be accurately estimated only by actual experience.

Sometimes you will find it necessary to use double and even triple the amount of powder, or the number of sheets, but the material can be purchased in different sizes, and directions are given with it, so that, provided you are a careful observer, you should be able to make the proper exposure under all ordinary conditions.

The following table as given by the manufacturers of the Eastman flash sheets will be found very helpful:

Subject at ten feet and light walls and hangings:
Use ONE No. 1 sheet.
Subject at ten feet and dark walls and hangings:
Use ONE No. 2 sheet.
Subject at fifteen feet and light walls and hangings:
Use ONE No. 2 sheet.
Subject at fifteen feet and dark walls and hangings:
Use ONE No. 3 sheet.

Two or more flash sheets should never be placed one upon the other, or a number of sheets be pinned with corners overlapping, as the combustion is somewhat rapid and there is the possibility of a sheet blowing off and dropping on the floor while burning.

The flash sheets do not produce a sudden flash when they are lighted, and a second or so is consumed in burning a single sheet. As compared with the ordinary flash powder they give a much broader source of light, which means that they do away with the harsh shadows that are so objectionable in most flash light work. The flash from the sheets is far less blinding than that from the ordinary powder, a decided advantage in giving pictures without the staring effect to the eyes so often seen.

For securing pictures of interiors in the daytime the flash light is a wonderful adjunct, as, by careful manipulation the flash and shutter (set on B) can be operated at practically the same instant, and as a result, the interior illuminated by the flash, and the windows given just enough exposure to register them on the plate as they naturally appear, without a particle of halation.

Some of my own most popular "genres" indoors were produced in this manner. Figure 136 illustrates one of them. It was made with a very small flash and a ½-second exposure. More flash would have given it an unnatural appearance by burning up the shadows which naturally existed.

Familiarize yourself with this phase of photography and you will have something to engage your ingenuity as much as you like.

Flashlight material can be used, also, in the form of Magnesium Ribbon. It has the advantage of being a slow burner and is very useful for producing firelight effects.

Development of flashlights should be done either with the tank or with diluted tray developer, in order to prevent excessive contrast, and to permit the detail in the shadows to develop out.

Cloudy Day Photography

Whether your camera is a low priced one or the most

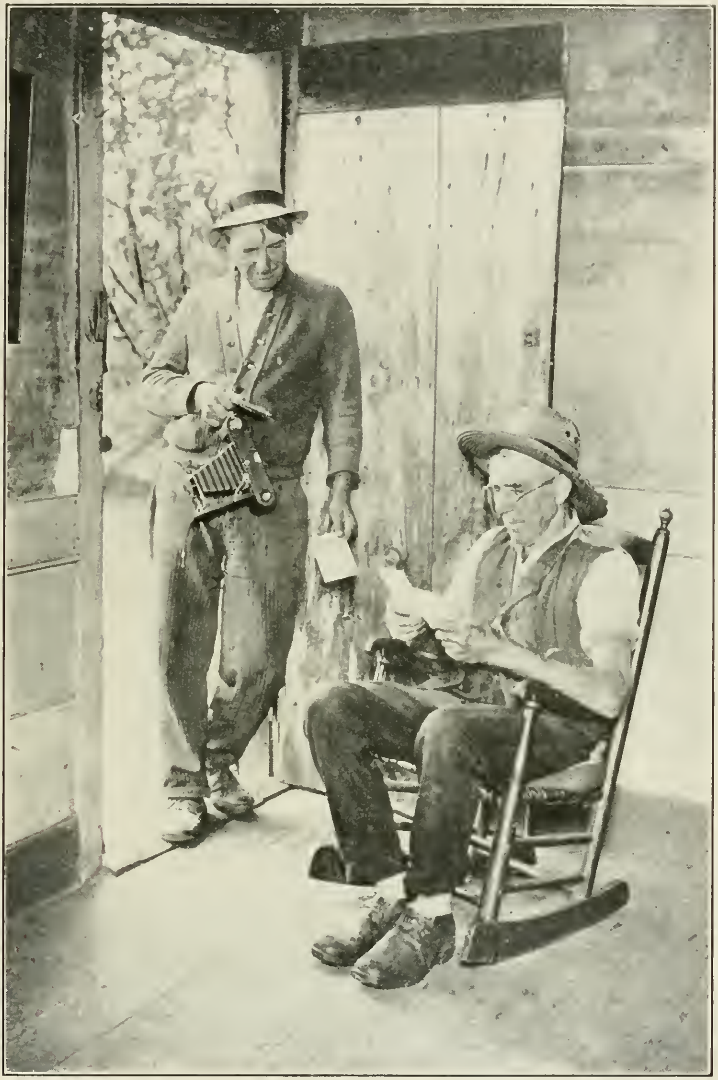

Fig. 136
Admiring the Results—A picture made with a flash in the daytime

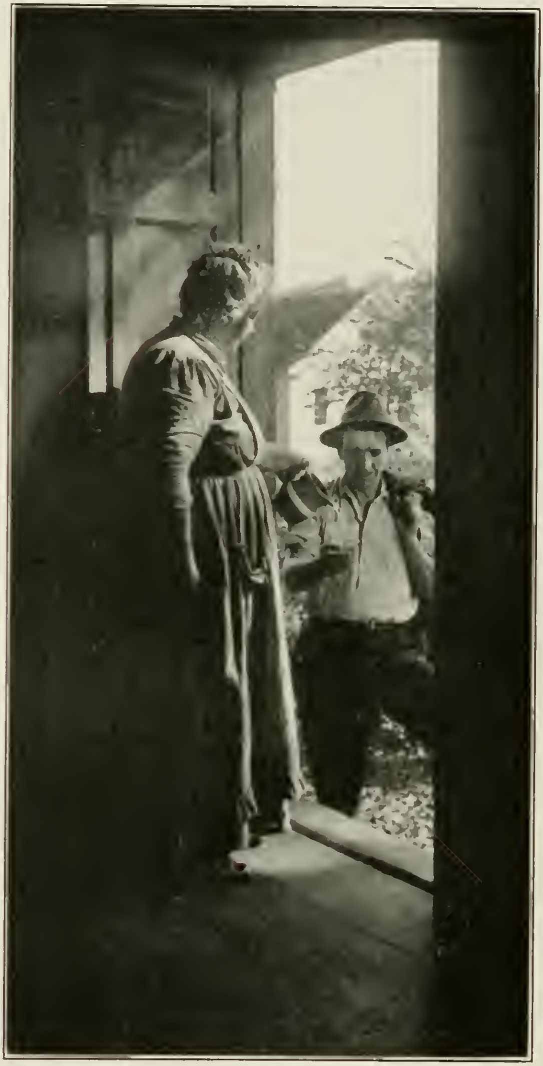

Fig. 137

Kindly Country Folks—A picture similar to Fig. 136 but with no flash—no illumination of shadows expensive made, you can, under certain conditions, produce fully timed snap-shot negatives when there is no sunshine, provided you are a careful judge of exposure.

The conditions under which cloudy day snapshots can be successfully made are determined by the amount of light that passes through the lens, by the intensity of the light at the time the exposure is made, and by the color (light or dark) of the subject.

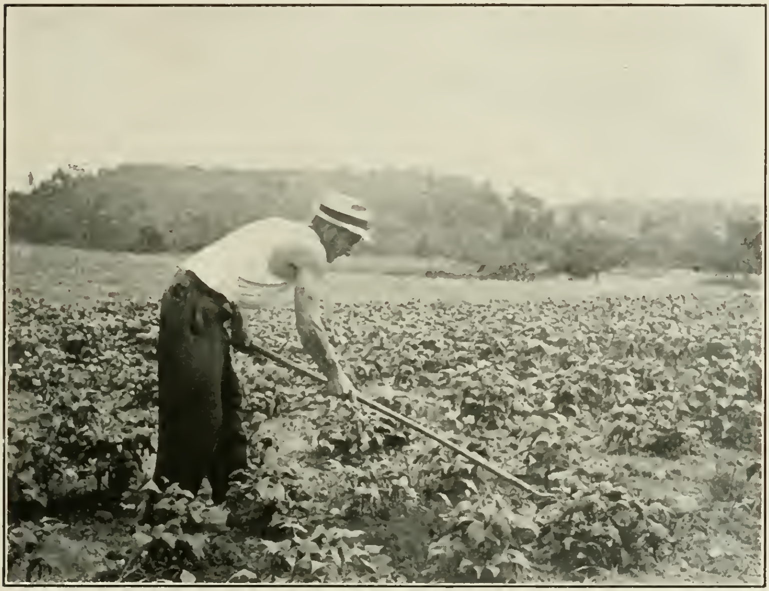

Fig. 138
Fighting Weeds—A cloudy day snap of 1/25 second at F6.3

A rectilinear lens, which is a double lens, will pass more light than a single lens, and an F 6.3 anastigmat will pass about 62% more light than a rectilinear.

When the largest stop is used on single lenses a snapshot exposure (or 1/25 of a second if the shutter has speed markings) will yield a fully timed negative of a distant landscape, an open landscape on which no prominent dark objects are within 50 feet of the camera, and of light colored objects that are 30 feet or more distant, between the hours of 9 and 3 in the summer, and 10 and 2 in the winter, on days that are cloudy bright —not cloudy dull.

When the largest stop is used on rectilinear or anastigmat lenses, fully timed snapshot negatives can be made when the light is weaker, or the subject darker in color or much nearer the camera, than when single lenses are used.

Good snapshot pictures can be obtained of any white building near which are no tall trees, with a single lens camera, when the largest stop is used. If, however, there are green masses of foliage nearer the camera than 200 feet a snapshot will not be sufficiently long to register detail in them, consequently they would appear as dark masses if snapped on cloudy bright days.

The position of the sun, if it were out, is another important consideration when estimating what exposure to give on such days as we are discussing. If it is in such a position as to present the more highly lighted side of the subject to the camera the chances of securing a sufficiently timed plate are much better than if it were towards the front and thus responsible for causing the scene in front of the camera to be poorly lighted.

With the faster anastigmat lenses it is possible to tackle, with confidence, any, except the very extreme, type of landscape—and by extreme I refer to heavy masses close at hand and particularly trees with dense foliage. It is a fact that many a cloudy day picture is often more pleasing than any you could obtain of the same subject when the sun shines, especially if the subject contains strong contrasts of light and shade.

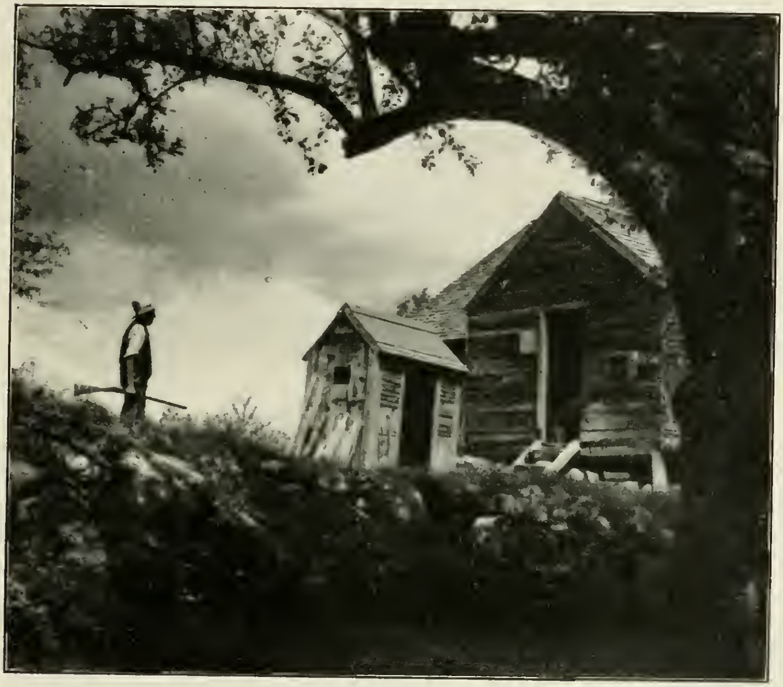

Fig. 139

When Clouds Hang Heavy—A good test of a lens. A snap of 1/25 at F 4.5. Sun behind cloud

Wild Animal Photography

This is a phase of photography that is in a class by itself. It is not only difficult, as it requires a great deal of study on the characteristics and habitats of wild animals, but what is more, it requires a special form of equipment.

The camerists who have established reputations in this field are very few, comparatively, but fortunately for many would-be photographers of wild life, these men have contributed generously to the photographic magazines and other forms of literature, and it is not a difficult matter at all for anyone to secure all the information they desire by communicating with the editors of the several magazines which I have mentioned elsewhere in this book. One of the most prolific writers on the subject, and without question, one of the foremost authorities is H. A. Middleton. His articles are always illustrated and his reading matter is not only instructive but exceedingly interesting.

Home Portraiture

Portraiture is an art in itself, and is somewhat beyond the beginner's field of activity, but, nevertheless, it is a field that every amateur aspires to enter, sooner or later. If you aspire to become adept in this department, you should make a thorough study of the subject under efficient experts. I will outline the general principle here:

The essentials, aside from a fairly good camera, are as follows:

1—Proper Lighting.

2—Pleasing Backgrounds and Good Reflectors.

3—Proper Posing.

4—Correct Exposure and Development.

Although an ordinary hand camera can be made to perform pleasing work, yet the operator is handicapped unless he can study the lighting and other effects on a good ground glass; therefore, the stand camera, including the view camera, has a decided advantage over the hand camera.

Home Portraiture, nowadays, is not carried on according to the stereotyped methods of former days, when a north window and head rest were thought to be necessities. Methods of lighting, within the past few years, have undergone a most radical stage of experimenting, with the result that it is not at all unusual to see indoor portraits taken plumb against the window, and even in the sunlight which streams through the window. Such extremes have been made possible through the perfection of the double-coated plate and methods of manipulating the plate in the developer.

In general, however, the principles of conservative lighting, and what the beginner should practice, are quickly stated.

The figure should be lighted by placing it six feet or more from the window, through the upper section of which the light is admitted, so that it falls on the sitter at an angle of 45 degrees—it will fall at this angle automatically if the lower portion is covered with some kind of shade or cloth. The lower half should be blocked with opaque material if the sitter is dressed in white, and with translucent material if the sitter is wearing red, black, or any other color that easily absorbs actinic rays of light.

The light from all other windows should be subdued in order to soften the lighting arrangement. Bear in mind that the stronger the lighting, and the closer the sitter to the source of light, the less the shadows are illuminated, therefore the more you can diffuse the light, the softer your negatives will be, provided proper exposure and development is given.

In order to throw light upon the shadow side of the face, throw a white towel over a high-backed chair and place it so that it will accomplish its purpose—the reflected light should meet the dark side of the face just where the highlight ends.

Watch for double catch lights in the sitter's eyes, and overcome this trouble by further blocking up the window that is causing the trouble.

If the sitter is ornamented with spectacles, watch for reflections therein, and overcome this by having the head properly regulated.

A well lighted portrait should have a highlight on the forehead, on the lighted side of the face, on the bridge of the nose, on the tip of the nose, on each cheek, on the lips, the chin, and a catch light in the eyes.

As to the background, if the sitter is a few feet from the wall and a large stop is used, even quite prominent figures in the wall paper can be adequately subdued; otherwise it may be expedient to hang some such curtain as a shawl or robe on the wall back of the sitter, care being used to see that no folds or wrinkles show.

Have the subject assume a natural pose as far in as possible and aim to keep his mind off the fact that you are taking his picture, otherwise he will be apt to look

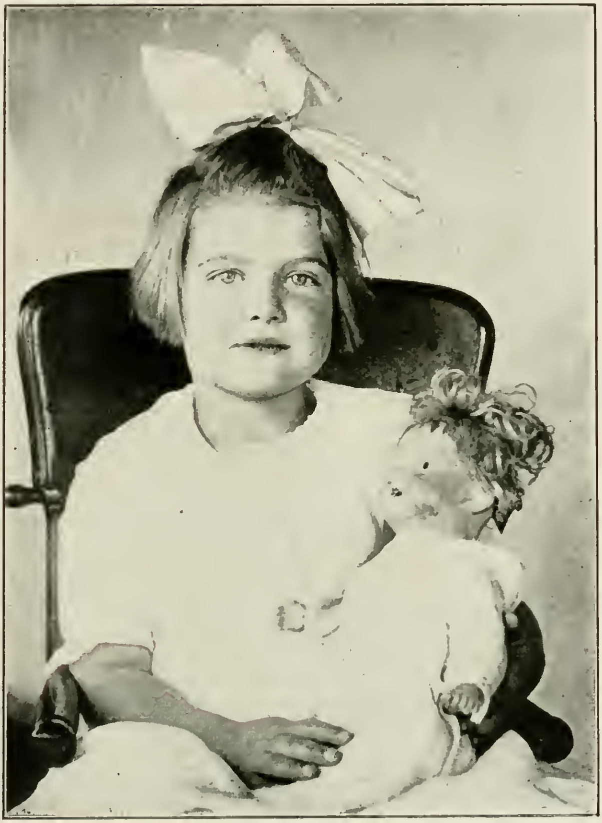

Fig. 140

Barbara—Home portrait in which the light was too strong from the lower half of the window thus killing detail in the dress.

any thing but natural. You can help matters a lot by keeping up a conversation on some subject in which the sitter is interested.

If the sitter is a child, your posing difficulties will be lessened for it will naturally assume a graceful pose if left alone, and your own efforts to improve the pose will consist of arranging obstinate ribbons; etc., and in seeing that the hands are not too prominently placed. But beware of fussing around it too much, and of using too many "dont's"—use tact in your handling of chil-

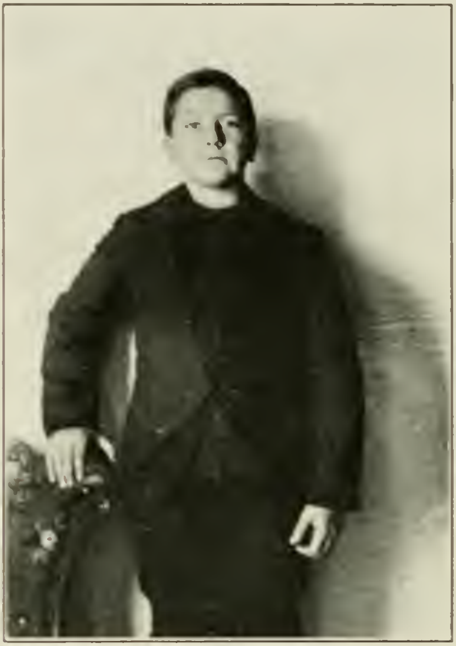

Fig. 141

Ernest—An attempt at home portraiture in which the light is too strong. By *Francena French.*

dren, when taking their pictures, if you never do at other times. Of course, in trying to photograph children inside, you cannot give so much attention to correct lighting, position, etc., as should be given to regular portrait work.

The exposure to give is a matter of expediency if the subject is a full-blooded, rollicking youngster, for he will never be still for longer than 1/5 of a second. This is all too brief, even with the largest stop, that is, under ordinary conditions, but in most cases, unless the walls are too solemnly colored, will do for such work as child portraiture.

The plate must be developed properly or your efforts will have been for naught,—by "properly," I mean either in a tank or in a diluted tray developer. In the case of tray developer keep a careful eye on the negative lest it develop out too strong in the highlights, in which case all detail in the shadows, and all roundness of tones will be lost.

Bear in mind that no matter what kind of photographic work you are doing, between the strongest lights and the darkest shadows there are beautiful gradations, and these are what you must preserve in order to make beautiful prints from them. Under-exposure and over-development are menaces to such results.

Telephotography

This rather lengthy term applies to photographic work with the tele-photo lens, the type of lens that overcomes distances and difficulties of inaccessibility through its telescopic possibilities.

Although such a lens is used quite extensively for taking close-up views of distant mountains and other features of nature, it is not limited to this kind of work, for many advanced amateurs perform their best work with such a lens in the right kind of camera—a long bellows camera.

Anyone who possesses a view camera with a long extension bellows and a double lens possesses the equipment for doing telephotographic work. By removing the inner lens (in most cases) it is possible to record images of distant objects on the plate, in magnified proportion as compared with what the complete lens would do.

For recording scenes free from violent perspective and for recording pictorial compositions on the plate without including a lot of superfluous material such a combination is invaluable.

The main handicap is the necessity for an exposure approximately three times as long as what the complete lens would require, a condition which is somewhat annoying on a windy day.

Copying

Occasionally you will find it desirable to make a copy of an old photograph, or possibly you will pass through the experience sooner or later of breaking or losing one of your treasured negatives and thus find it expedient to know how to make a copy of one of the prints which you made from it once upon a time. Or possibly you may wish to copy a painting or a manuscript of some kind. It is not a difficult matter to make a copy if the subject to be copied has a smooth white surface and you are equipped with a folding camera possessing a ground glass. But without such copying facilities, don't waste the time in making the attempt.

Granted you are properly equipped, let's make the copy by placing it in an even light, for instance, out of doors against the side of the house. Unless the light is even and strikes the picture from the front, you are likely to secure a course grained copy due to the minute shadows which the uneven surface of an apparently smooth picture will cast when the light strikes it from the side.

An even better precaution is to place the picture under glass, being careful when copying that no reflections appear on the glass. This can be prevented by having someone hold a black cloth just in front of the lens with a small hole cut through it for the lens to project through.

You will doubtless experience considerable difficulty in focusing, but after several attempts you will solve the difficulty.

The way to go about the process of copying is to remove the front lens from your double combination and extend the bellows a foot or two. Then with the lens open, place the tripod so that the lens is quite near the picture to be copied, which should be placed so that it is unside down, thus making the image on the ground glass right side up and easier to focus upon. Then, with your head under the focusing cloth, draw the camera backward until the image appears sharp on the ground glass. If you want the image larger, move the camera nearer the picture, and refocus, and so on, until you secure the desired results.

A somewhat lengthy exposure will be necessary, owing to the close proximity of the camera to the subject, and to the extra extension of the bellows. If you are doing the operation out of doors, the exposure with stop U. S. 32 will probably need 12 seconds—this is just an approximate estimate. If artificial (electric) lights are being used, illuminate the picture from each side of the lens; this will cause the lighting on the print to be even so that there are no grain shadows on its surface.

If the subject to be copied has a rough surface, be sure to place it under glass.

If it is a sepia, or is buff colored, or painted, you should use Panchromatic plates and a ray filter.

By wetting the picture just before placing it under the glass, and by also pressing it into close contact with the glass, you will secure even better results.

Copying requires more correct exposure than almost any other subject, so don't be discouraged with a few failures when you first attempt to learn it.

In focusing, first use the lens wide open then stop down.

Speed Photography

It is well to know before you waste a lot of good film that with the ordinary snapshot camera the fastest exposure of which is 1/100 of a second, you cannot make decent speed pictures of objects which are moving across the field of view from one side to the other—

you will get only blurred results if you try it. You have, no doubt, been to the movies; now think for a minute, and recall how some of the actors in the pictures appeared on the screen when moving across it from one side to the other. They were blurred of course, and the nearer they were to the camera when snapped, the more they were blurred. Therefore you will perceive that such pictures as races, trains in motion, and so on, can not be successfully pictured with the ordinary snapshot camera, when moving across the field of view. The same objects can, however, be photographed with good results when moving towards or away from the camera, or even at an acute angle to it.

With a lens working at 1/300 and faster, particularly a focal plane shutter type, such as the Graflex, you are ready to "go gunning" for almost any kind of motion picture.

Provided you have the proper equipment you now need a good eye for judging what stop to use and where to stand, what speed the prevailing light conditions will permit, and when to snap.

As to the stop to use, it depends on what depth of field you desire. If you are after the finish of a foot race, naturally you are not fussy about securing sharpness, except in the very foreground, but if you are after a picture of an exciting football play with the twenty-two players pretty well spread out, you will need to stop down just as much as permissible. It has been demonstrated that in high speed work, the best results are secured where the image of a man is about one and one-half inches in height, while the image of a rapidly moving horse should not exceed one-inch from shoulder to hoof; so if you can be content with producing an image one and a half inches in height, you will get sufficient depth with the largest aperature of the lens. It is only when dealing with unusual subjects, such as large or extended groups, that it may be necessary to determine the largest stop that can safely be used and still retain good definition.

If photographing children at ordinary play, it will be possible to stop down to F8 and use 1/100 of a second —barring extreme action, of course.

In order to secure a sharp picture of a sprinter running at right angles to the lens, and at a distance of from 30 to 40 feet away, a speed of 1/1400 will be required; but if you will snap him at an angle of 45 degrees to the lens, 1/1000 of a second will suffice.

It is a wise policy to use the lens wide open for all pictures when high speed is necessary, but stop down as much as judicious under conditions that will permit—when taking action pictures.

The trick of snapping at the opportune moment is a knack and can be acquired only by practice. A good rule to follow is to press the button an instant before the subject reaches the point which you aspire to picture, and the faster he is moving, also the nearer he is to the camera, the sooner you should snap.

A description of my first attempt to make a speed picture will prove helpful, I believe. During one of my first rambles with my new Graflex in search of something unusual on which to try it out, I chanced upon a group of youthful divers. Gee! What a find!

Even the youngsters were enthused and volunteered all kinds of poses. But all I wanted were some pictures of one or two of them sailing through the air. Being possessed with a smattering of speed picture knowledge, I endeavored to gauge my snaps so that the lens would catch the divers just before they would hit the water. Several exposures were made in perfect faith that I had pressed the button at just the right instant.

Then I aspired to snap a few more just as the boys' toes were leaving the spring board. Just the thing happened that usually does occur under similar circumstances, with the camera in the hands of an inexperienced speed worker—the first group of exposures had registered nothing of the divers except their legs and feet, and the second group had caught them in the awkward position of preparing to spring. In the first instance I had not made sufficient allowance for the speed at which the boys were moving through the air, and in the second, I had gauged my operations on the basis of rapid movement and had snapped before the momentum on which I calculated had been acquired. It was a worth-while lesson to be sure.

Composition

The term "composition" seldom enters into the beginner's thoughts, but when he reaches the stage where he graduates from the record picture class, it is quite essential that he master, to at least an elementary degree, the principles of composition.

Any one can dab beautiful oil-colors all over a canvas, but it is only he who can so arrange those colors as to form a pleasing picture, possessing atmosphere, balance and tonal quality that will ever be ranked as an artist.

Similarly, a camerist may thoroughly master the technical side of photography and be able to produce beautiful tones in black and white and sepia, but unless his pictures possess atmosphere, balance and a few other essentials he cannot be classed as a pictorialist.

It is not a simple matter to lay down in a limited space the complete principles of composition; in fact, it would be the height of the ridiculous to attempt to do so, therefore please understand that what I shall give you is simply enough to whet your artistic appetite; then, if your ambition waxes keener, seek for more elaborate knowledge on the subject in the books of such authorities as Hartmann, Poore, Dow and Hammond.

Their books on composition deal solely with that subject in its relation to pictorial work, and are therefore great helps to the seeker after advanced knowledge.

Now to be brief and specific:

The Determining Factors in Composition

1. Unity. 2. Balance. 3. Perspective.

Unity

Unity is that quality by virtue of which one point of interest is made of paramount interest through the co-operation of all other elements in the picture. These other elements may consist simply of lines which lead to the point in question; or they may consist of sub-

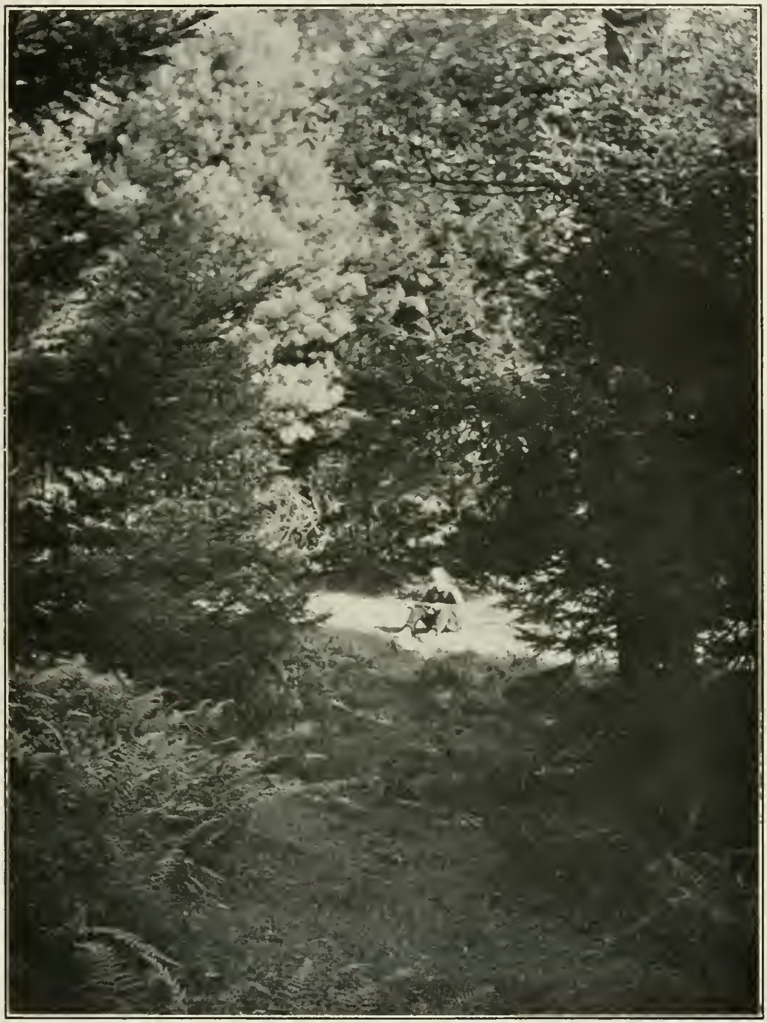

Fig. 142

The Stage in the Forest—Illustrating unity in composition, no distracting elements; interest centered

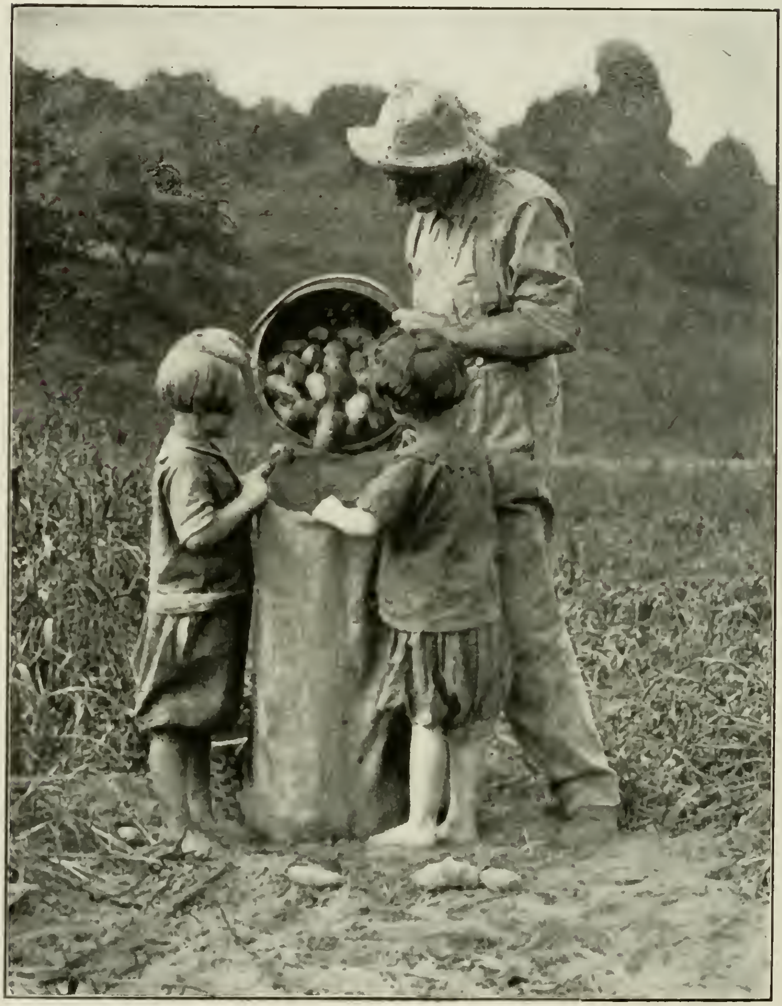

Fig. 143

Grandpa's Little Helpers—Unity simplified—three figures with their interest centered on one and the same thing ordinate tones; or of objects which, by virtue of their position, lead the eye to the principle point of interest.

The center of interest should never be in the center of the picture, otherwise the composition will be divided and unity will be destroyed, therefore you will perceive that symmetry of lines are not symbolical of good composition.

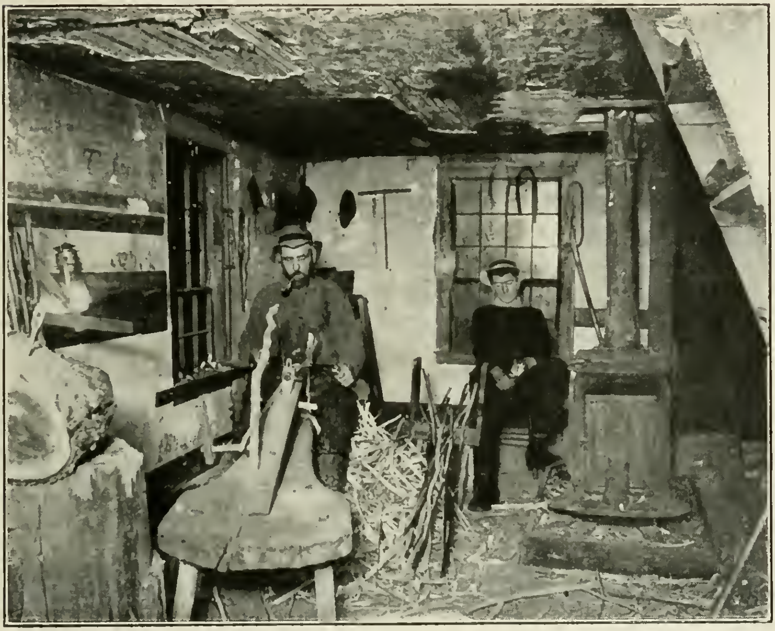

Fig. 144
The Hoop Maker's Shop—Illustrating lack of unity in composition—two different points of interest

It is an interesting fact that the principal point of interest is not necessarily a thing of beauty—it may be only a bright spot in a lonely forest, or the disappearing point of a winding roadway; or a rubber ball in a child's hands; or a person occupied at some task. So you see, it is not the point itself which makes the picture, but the position which lines, figures, etc., assume in their efforts to center interest upon it. Let me cite a few concrete examples:

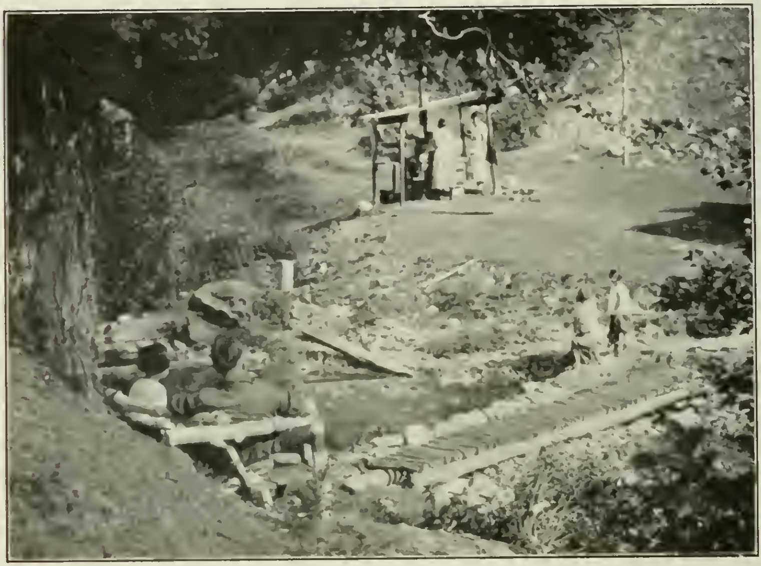

Fig. 145

In Camp—A good composition in respect to position of elements, but lacking in unity as there seems to be no common point of interest. By *H. H. Phillips*

Two children are at play; one is staring at the camera; the other is engaged in picking up a kitten. In such a picture divided interest exists. Turn the curious boy around and have him look at the pussy, and the picture, as far as unity is concerned, is made.

A roadway winds along the banks of a river. In this road is a team; in the river is a sailboat. There are two centers of interest here; one should be eliminated. In fact, it is a rare case to find two such pictorial subjects as a road and a river in the same picture so allied as to produce unity.

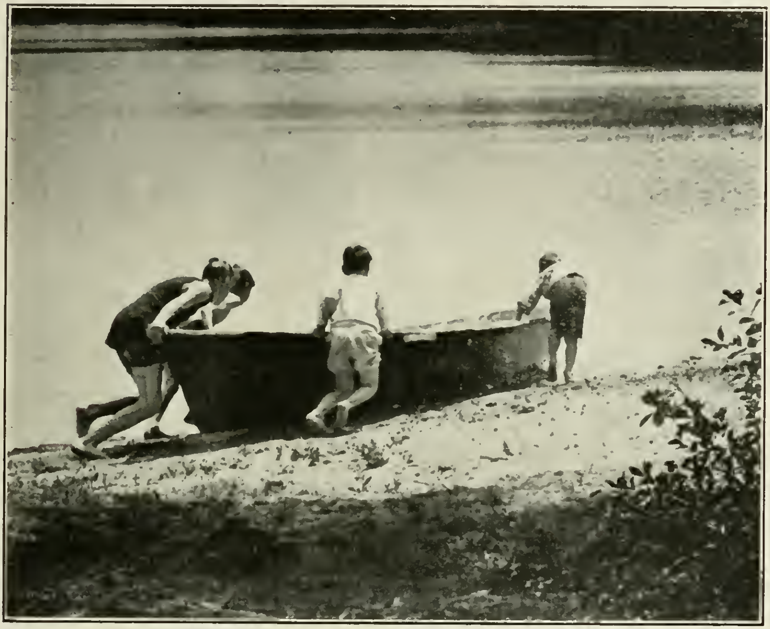

Fig. 146

The Launching—Illustrating unity which has been simplified by judicious trimming, common action by the four boys, and unobtrusive foreground and other details

Have I made my point clear? I will go a bit further by enumerating several more rules to observe when attempting to make pleasing compositions.

1. When human figures are quite prominent in the picture which you are making, see that they face into

the picture rather than out, and that there is liberal space ahead of them, especially if they are represented as moving towards any particular point. The same rule applies to any moving object, whether man or beast.

Don't let the impression be given in the picture that further progress on the part of moving objects would result in their moving out of the picture space. Of course, in general practice, there are exceptions to the rule, especially in speed pictures, but I am referring particularly to pictorial work instead of to record work.

2. A real picture should express a thought or tell a story, and every element of the picture should play a part in helping to express the idea attempted. In a landscape, for instance, which we wish to make symbolical of spring, the theme can be accentuated by including several children engaged in romping on the greensward; whereas, if instead of children, we should include the figure of an aged person plodding along, all unity of thought would be destroyed. We could, however, save the picture by giving it a different title, such as "The Journey is on Again," and thus have a picture which expresses a motive, even though it is not what we started out after.

3. There should be but one strong mass of highlight in a picture. All other blotches, especially those near the edges of the picture, should be eliminated. This, in brief, can be done by reducing them on the nega-

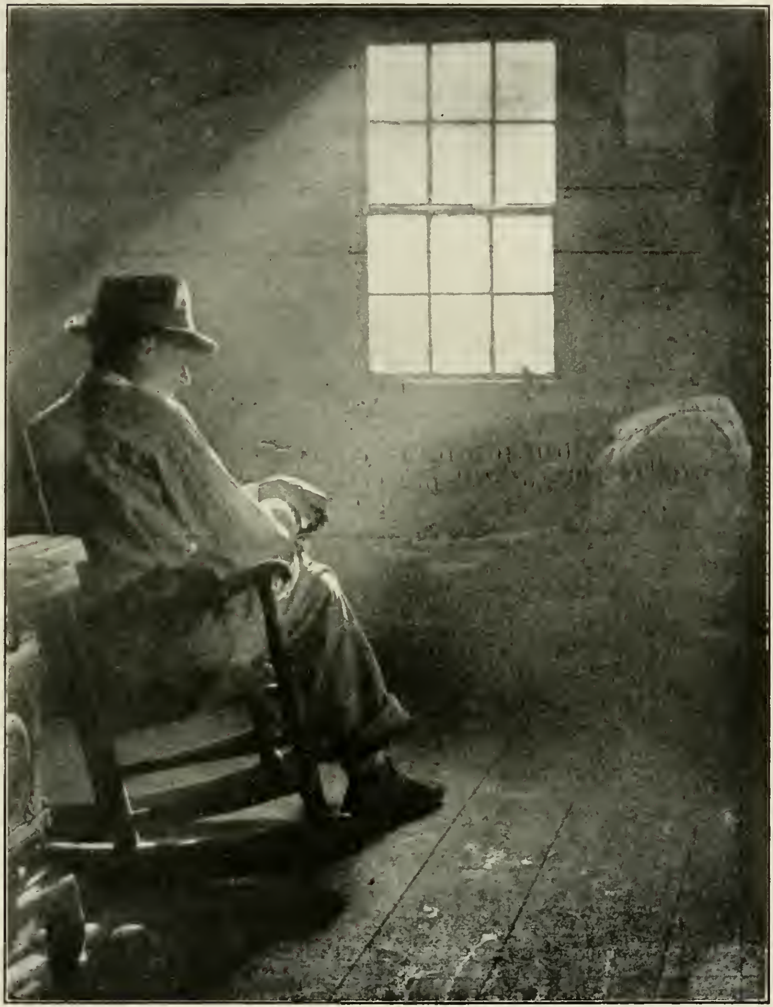

Fig. 147

Out of Work—Illustrating "Motif." The character herein is dejected and his surroundings help carry out the suggestion of the title

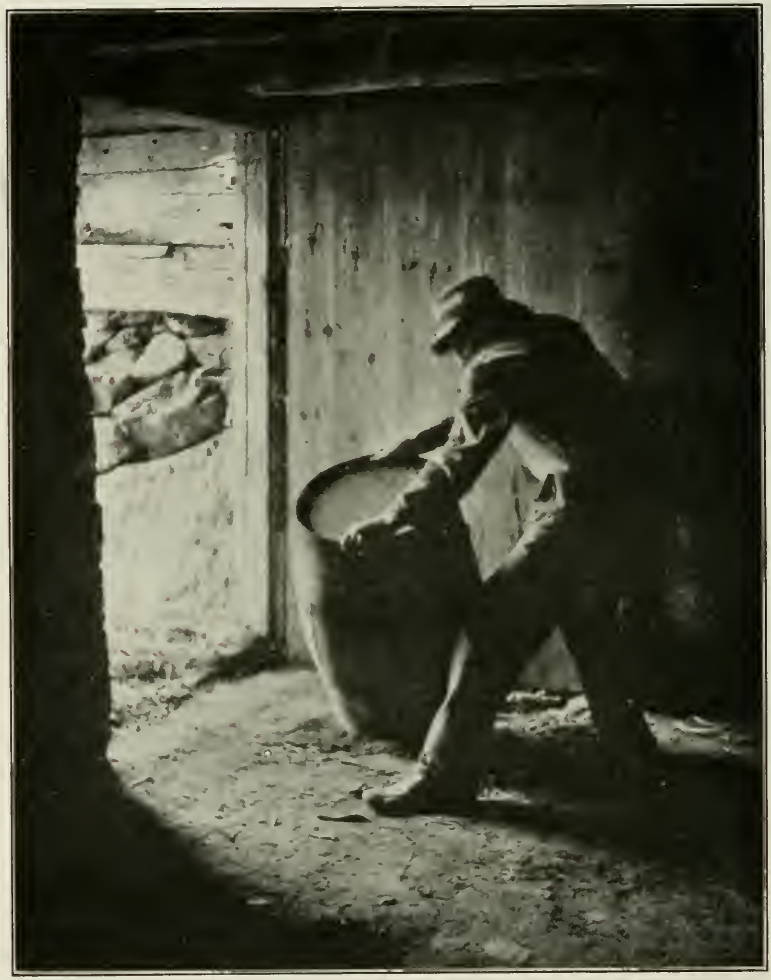

Fig. 148

Bending to the Task—Another story telling picture. Action and strength well pictured and lighting ideal tive; or by using a stomp and crayon sauce on the finished print—the articles are obtainable at any store which handles artists' supplies.

It may be possible to eliminate the blotches entirely by trimming them off, or by enlarging but a part of the negative.

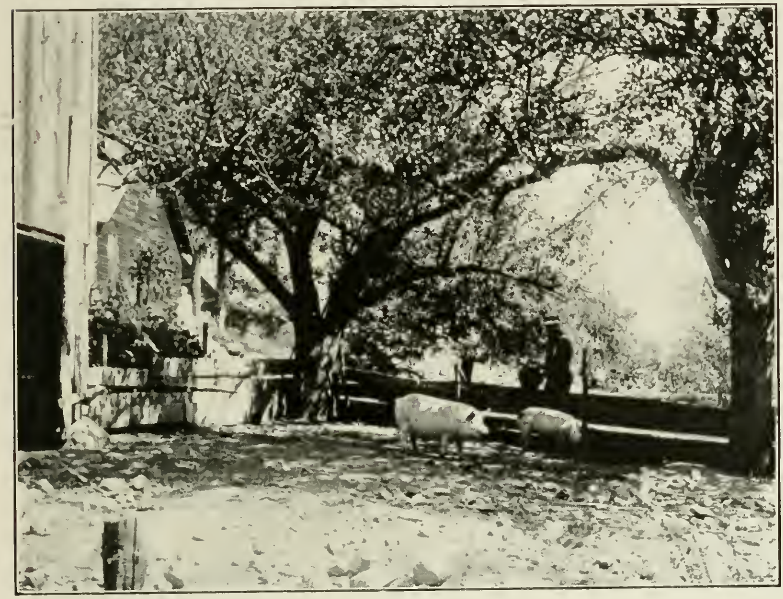

Fig. 149

On the Farm—Picture containing many distracting highlights

4. When figures of prominent size appear in the picture be sure that there are no distracting objects in juxtaposition to the heads. Very frequently you will perceive what appears to be a tree or a stake or some other monstrosity growing out of a head in the picture; this is due, of course, to being somewhat unobserving

when taking the picture, or else to the impossibility of finding a better background.

5. Shadows, if properly utilized, especially long slanting ones, can be made to add unity to the picture by leading the eye towards the center of interest. They can also be advantageously used in securing "balance."

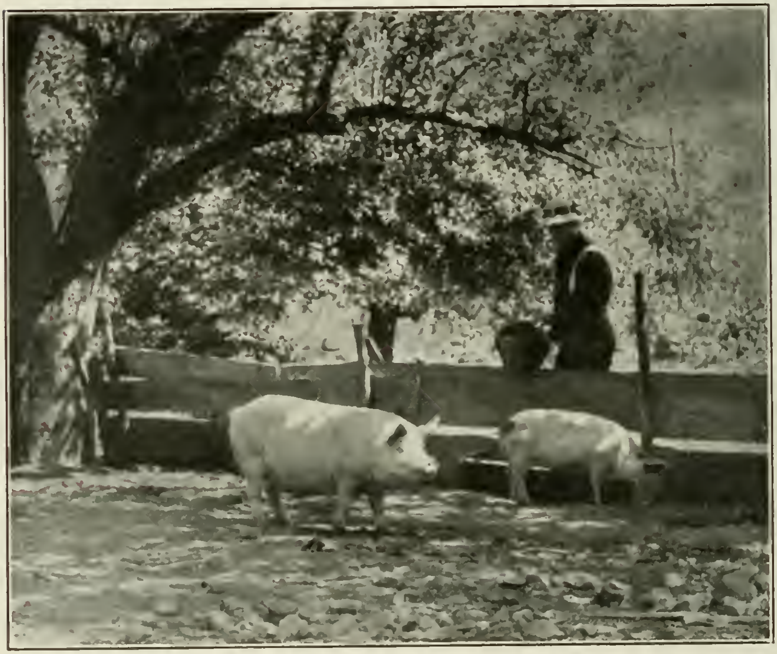

Fig. 150

Fattening the Porkers—properly trimmed and rid of distracting highlights, by use of the pencil, crayon sauce and stomp

6. When several objects, either human or inanimate figures, are included, avoid having them so placed that a line joining their bases would be a straight line.

7. If the sides of a rectangular picture are divided

into thirds, and the corresponding opposite points are connected by straight lines, the four intersecting points are the ideal points for the principal object in the picture.

8. In figure composition two bulky masses should be connected in some manner by strong lines.

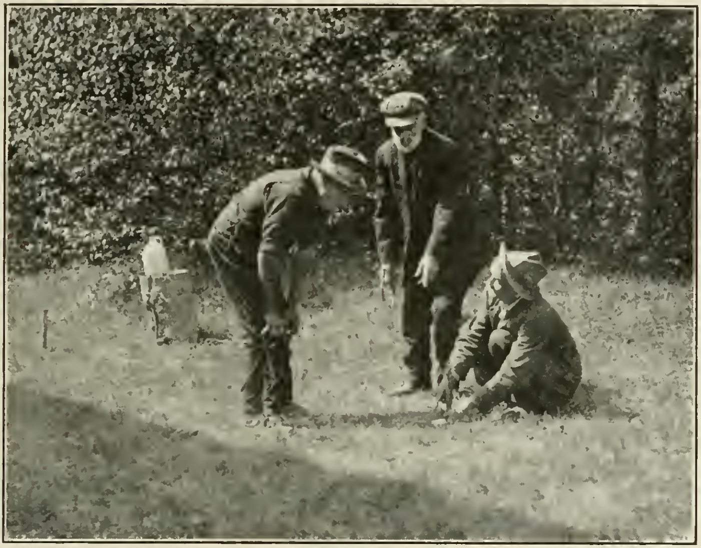

Fig. 151
The Argument—Illustrating irregular line of heads in composition

9. Be careful not to have extreme contrast between a human figure and the background.

10. When several figures are included see that they are not at equal distances apart. The best arrangement is to have them split into two or more groups of unequal numbers, one group of which is of more importance than the other, i. e., of more prominence; and in each

group see that no gaps appear between any two bodies. The two groups should not be but a very little distance apart if occupying the foreground of the picture, otherwise you will have a division of interest again.

11. In employing animate figures in the picture, they must either be the object representing the title of the picture, in which case they must occupy considerable space, or they must be used simply to help carry out the idea which you wish to portray.

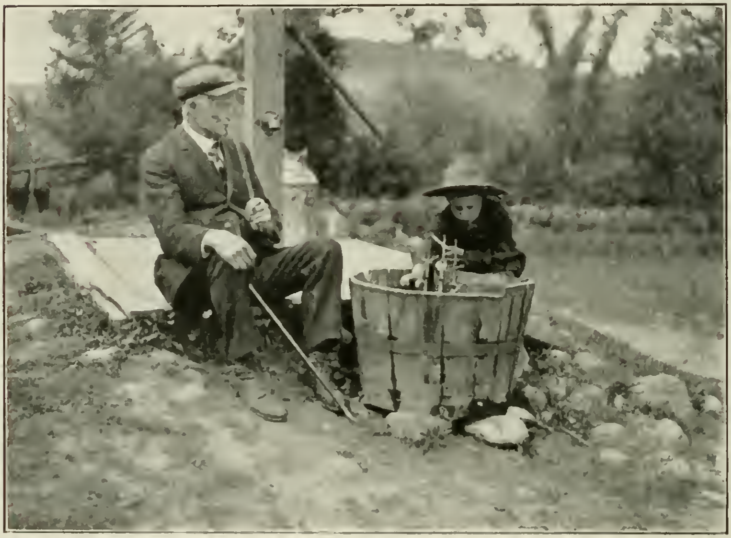

Fig. 152

The Shipbuilder—The principle of the stilliard is well illustrated here. Old gentleman and pump represent the object weighed, the boy and boat the balancing weight

In the latter case they should not occupy a space larger than what 1/6 of the diagonal of the picture would cover.

Balance

Did you ever see one of the old fashioned set of scales known as "stilliards"? If you have, you have seen what the greatest painters use as a model when explaining "balance" in composition.

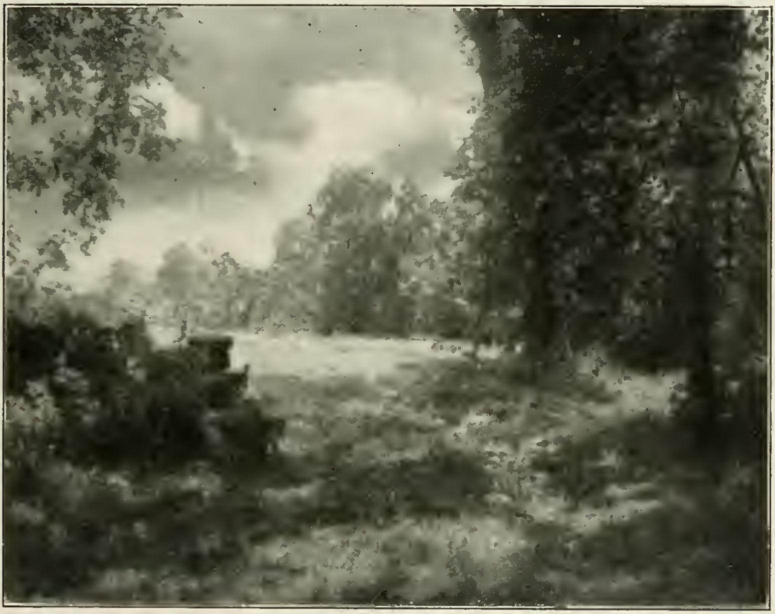

Fig. 153

Summer Landscape——A favorite form of composition—the sky occupying about 1/4 of the picture space and in a somewhat rectangular form

The principle of the stilliard is that the larger the object which is being weighed, the farther away it is necessary to place the weight which does the balancing; and the smaller this weight, the farther away it must be. The fulcrum of the stilliard is comparable to the center of the picture; thus, you see, the principal object and its balancing factor will be on either side of the center.

Balance is very easy to secure in a picture if there is already unity and you will apply the principle of the stilliards. So, no matter what the principal object is, whether it be a clump of trees, a person, a house, or anything else, there must be some balancing medium, irrespective of its nature. For example—a large tree in the foreground might be supplemented by one in the middle distance; or it might even be balanced by its own shadow, provided it extends obliquely towards the opposite side of the picture. A heavy mass of foliage might be balanced by a bright area beyond, etc.

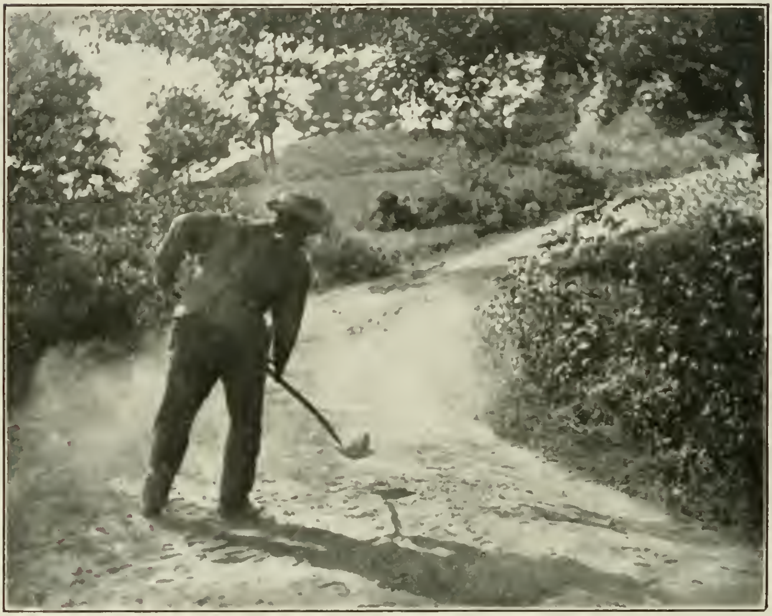

Fig. 154

The Roadworker—Here the shadow serves as the balancing medium

A great aid to good composition and balance are triangular effects such as are caused by the sloping profiles of mountains—a slant line in a picture should always be sought in preference to horizontal or vertical, except in such subjects as architectural; the ocean, etc.

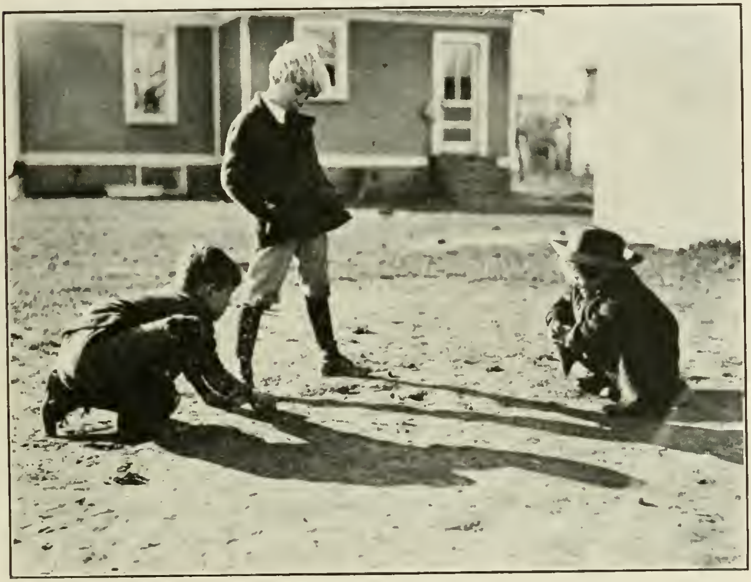

Fig. 155

The Old, Old Game—Here the triangular arrangement and the interesting shadows make a pleasing composition

Lines should lead into the picture instead of out of it, or across it to block the entrance; and curved lines, especially those shaped something like the letter S, are much more artistic than straight lines.

Triangular patterns and elliptical arrangements of lines are quite common in real pictures. The triangular form is nearly always sought when photographing

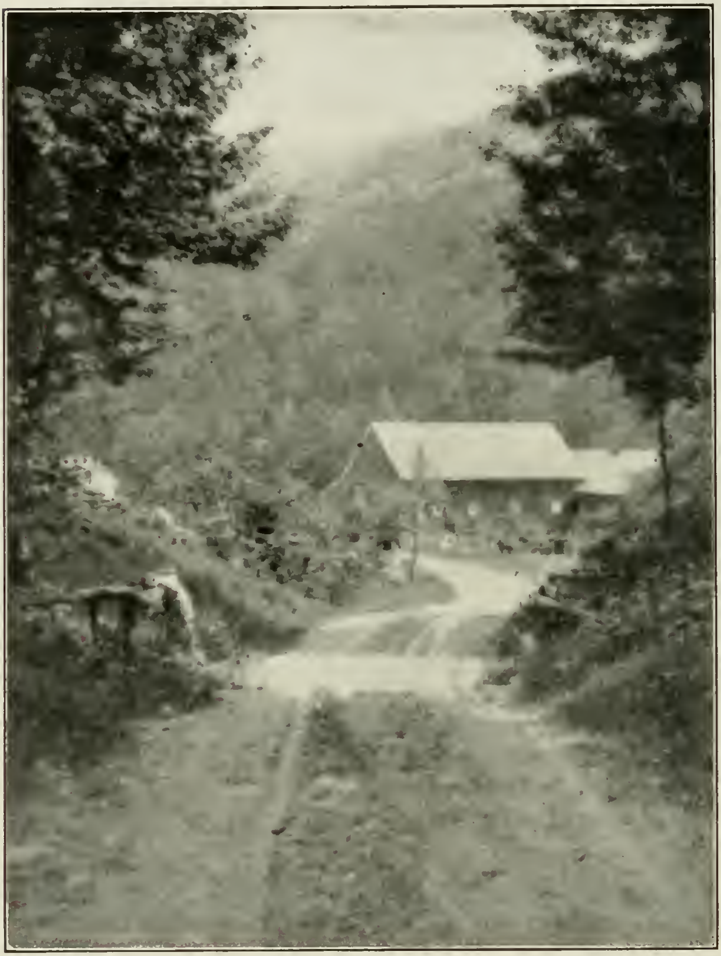

Fig. 156

Tucked Away Among the Foothills—Illustrating the advantage of sloping lines in producing unity trees. That is, it is common practice to so select three trees from a group that lines connecting their bases would, if joined, form a triangle (but not equilateral in shape).

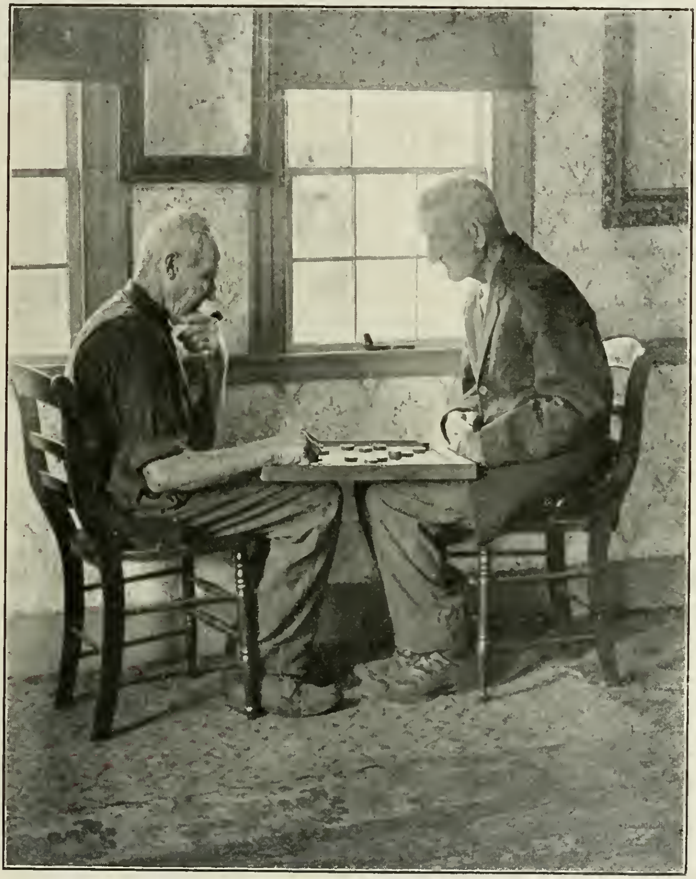

Fig. 157
The Critical Point—A good indoor Genre

Bear in mind that the success of a composition depends on some interesting, irregular, and if possible, geometrical shape, no symmetrical, however, nor over conspicuous. The eye should glide with perfect ease from one spot to another in a picture until it covers every detail.

As to the sky-line, it should have some break in it, and never be nearer the top or the bottom than 1/4 the height of the picture—except in special instances where an attempt is being made to picture great height or unusual characteristics, such as a beautiful sky, etc.

Perspective

Perspective plays a part in pictures in two different forms: Linear Perspective and Aerial Perspective.

Linear Perspective is the art of suggesting distance by the convergence of lines and by the diminishing size of objects according to their proximity to the eye.

We see this type of perspective most frequently in pictures of streets, roads, streams and paths.

Lenses of short focal length cause what is termed "violent perspective," by recording a rapid shortening and convergence of lines which run back into the picture. The Telephoto lens is "king" when it comes to recording such lines, because of its long focal length.

Aerial Perspective relates to the effect of atmosphere on distant objects, and to the tone of such objects. It is best seen on misty, or hazy days, and can be produced somewhat by using a large stop with the foreground in sharp focus; the effect being a diminishing of sharpness as the eye proceeds into the picture.

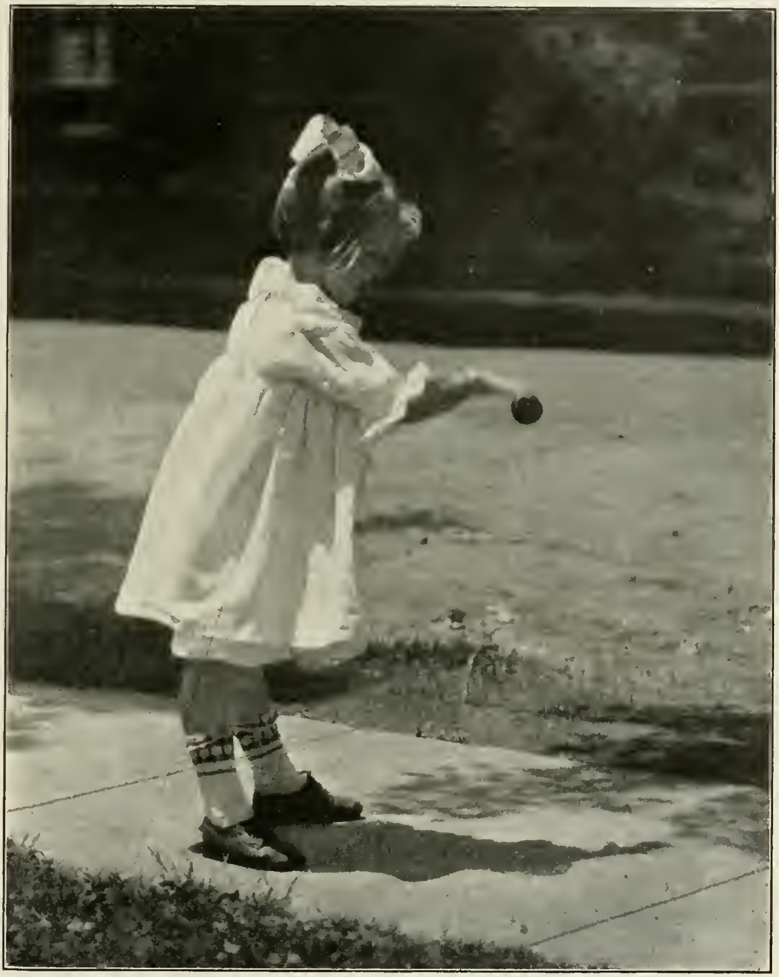

Fig. 158

Bouncer and Bounced—Shadows, properly taken advantage of, often make the picture complete. In this picture the foreground shadows are very helpful while the background shadows mar the picture

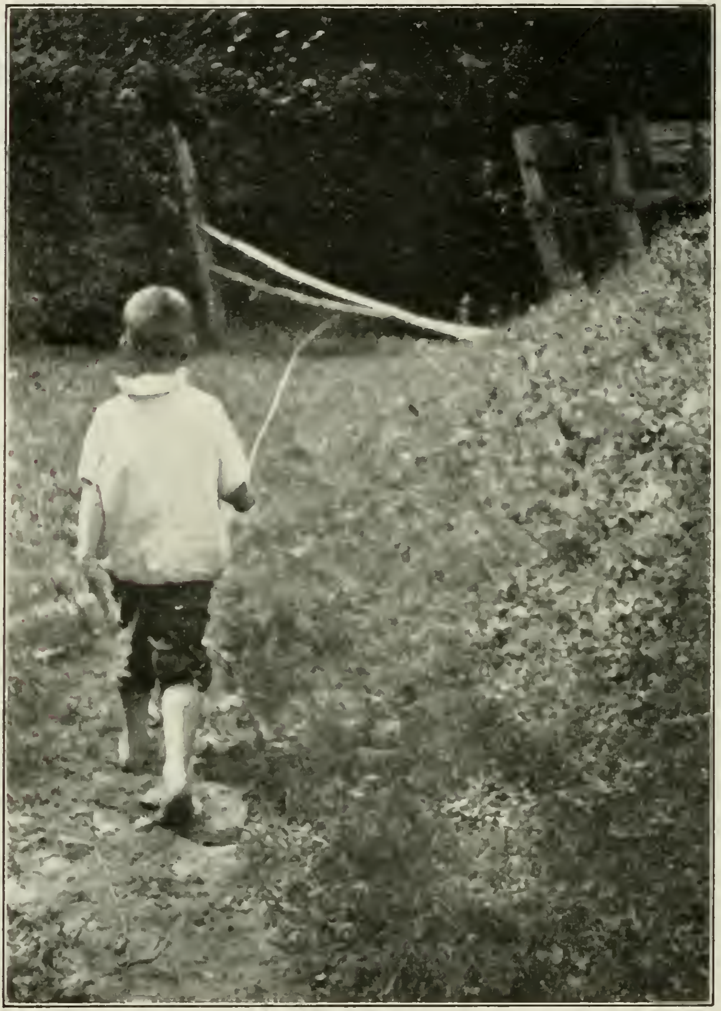

Fig. 159

Barefoot Boy—Principle of the stilliard well represented here. There is, however, need of another half inch or so of space at the left side of the picture.

Pictures taken with the lens stopped down to such an extent that objects are sharp even in the distance possess natural aerial perspective, but not the kind that makes for pictorial results.

Heavy foregrounds and diminishing tones in the distance, both the middle and the far distance, such as you get in vista effects, are always pleasing in good compositions.

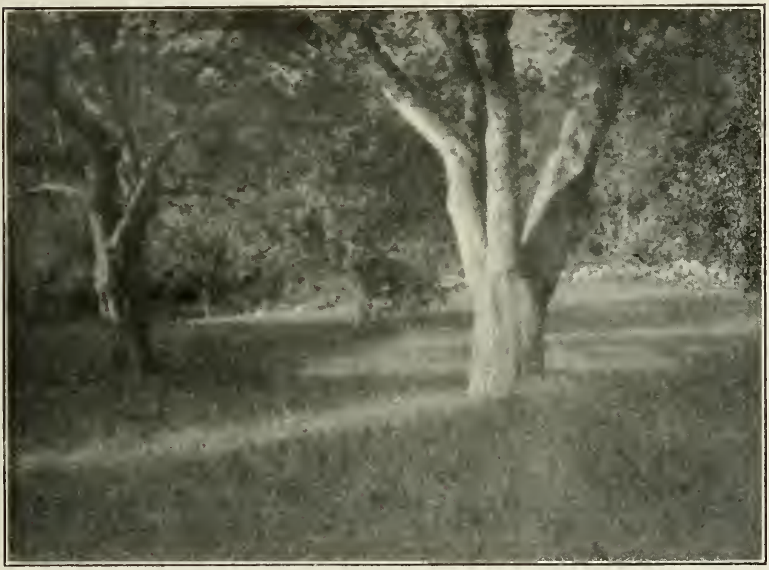

Fig. 160

A Lingering Splash of Sunlight—As simple as it is, the curving streak of light in this picture is a beauty-line. It also leads to the principal point of interest, the tree

Pictures taken towards the sun on hazy days possess beautiful aerial perspective, especially in the forenoon.

CHAPTER XIV

MAKING SOLUTIONS AND USEFUL FORMULAS

Making Solutions

ALMOST every one engaged in photography will find it to his advantage to prepare all of the various solutions used if he has considerable picture work to do. In the first place it adds interest to the work; and in the second place it greatly lessens the expense.

Apparatus Required

The first requisite of this work is a scale of some kind for weighing the chemicals; a regular prescription scale is the best and it should be sensitive to as small a quantity as one grain. There are, however, less expensive scales on the market, and by visiting a photo supply store you will be able to find something to suit your desire.

For measuring water or other liquids, a glass graduate is used, and the sixteen ounce size will probably be found to be the most convenient.

Other necessities are as follows:

Glass funnel.

Mortar and Pestle for grinding up chemicals so that they will dissolve more readily.

A number of clean empty bottles, with capacities of from four to thirty-two ounces, or even larger.

Hydrometer, if considerable work is to be done. The purpose of this device is to enable you to make up stock solutions quickly and accurately, so one is not necessary if you are doing just a little work off and on.

Stirring Rod for use when mixing chemicals and water.

Chemicals

Only the best grade of chemicals should be used, as many of the failures and disappointments in photography are due entirely to impure or unsuitable kinds. Do not attempt to use those that you can buy from the grocer and the druggists who carry them for household use only. Such chemicals are not designed for photographic use and are almost certain to result in failures.

Weights and Measures

Chemicals in dry form are always sold by Avoirdupois Weight, in which there are 16 ounces to the pound and 437½ grains to the ounce.

Formulas for solutions, however, are almost always given in Apothecaries Weight, in which there are 12 ounces to the pound and 480 grains to the ounce.

Useful Tables

Avoirdupois Weight

27.34 grains = 1 dram = 27.34 grains
16 drams = 1 ounce = 437.5 grains
16 ounces = 1 pound = 7000 grains

Liquid Weight

60 minims = 1 dram
8 drams = 1 ounce
16 ounces = 1 pint

Apothecaries Weight

20 grains = 1 scruple
3 scruples = 1 dram
8 drams = 1 ounce
12 ounces = 1 pound
1 gram = 15.4 grains
1 kilogram (kilo) = 2.2 lbs.
1 liter = 1.05 quarts
8 fluid drams = 1 fluid ounce
1 minim = 1 drop (approximately)

In purchasing chemicals it is always safe to use grains as the standard of weight, as they are alike in Avoirdupois, Troy and Apothecaries tables, while the other terms vary.

How to Make Solutions

Absolute cleanliness and accuracy are essential to success in making solutions. Keep everything clean, wash graduates and all other dishes and bottles as soon as you are through using them; keep all chemicals tightly corked in bottles; have a place for everything and keep everything in its place. Always have every bottle or package of chemicals properly labeled.

When compounding solutions, be sure to dissolve the different ingredients in the exact order as given in the formula.

Some chemicals dissolve more easily or rapidly than others, and various means are resorted to for hastening the process of dissolving. When a chemical comes in the form of large crystals, sulphite of soda or hypo for example, it should first be ground up or pulverized with the mortar and pestle, or else you should use water as hot as possible. By pouring a little cool water into the graduate and then gradually pouring in the hot water you will be able to make the solution real hot without breaking the glass; but you must be careful not

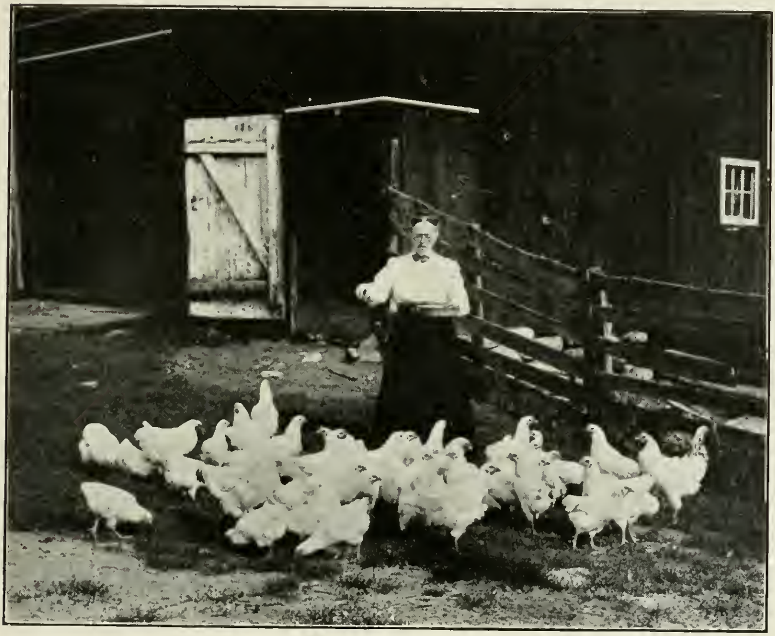

Fig. 161

Feeding the Chicks—Outdoor Genre. By *Geo. W. Sears* to place cold water in the glass directly after you have used the hot water in it!

Enamelware is excellent for making hot solutions, for the chemicals will not corrode it as they will tin or ironware.

Saturated Solutions

There is a certain limit to the amount of any chemical which can be dissolved in a given amount of water. When the water has taken up, that is, dissolved, all that it can, the solution is said to be saturated. As the solubility of different chemicals varies greatly, the proportions of water and chemical vary accordingly. As illustrative of the great differences in the relative proportions of water and solid chemicals necessary to form saturated solutions, take for example, potassium carbonate which entirely dissolves in less than its own weight of water, while on the other hand, eikonogen is so sparingly soluble, that it requires forty times its weight of cold water to completely dissolve it.

You will thus readily understand that in a saturated solution of potassium carbonate, the amount of the chemical in proportion to the amount of water is much greater than in the case of a saturated solution of eikonogen.

In making a saturated solution, enough of the dry chemical is added to the water so that no more will dissolve; enough, in fact, so that a small amount will remain undissolved.

Using the Hydrometer

Formulas for making solutions are sometimes given by "hydrometer test" instead of weight, and many photographers prefer this method. A hydrometer is a small glass instrument which shows the specific gravity of liquids. You will readily understand that the specific gravity of water increases in proportion to the amount of any chemical which may be dissolved in it, and the hydrometer enables us to obtain the correct proportions without the use of scales.

The stem of the hydrometer has a graduated scale reading from 0 to 80. When placed in pure water the hydrometer sinks until the 0 point is exactly at the surface of the water. If any chemical be dissolved in the water the specific gravity is increased, causing the hydrometer to stand higher in the solution, and the height to which it stands indicates the strength of the solution.

The easiest way to prepare a solution by hydrometer test is to first make a saturated solution, which can then be gradually weakened by adding more water until it tests to the desired strength.

Useful Formulas

Most chemicals are put up in "desiccated form" (powdered), and unless a formula indicates otherwise, you will work on this basis.

Whenever potassium carbonate or sodium sulphite is being used in crystal form you should use double the amount specified in the table, if the table calls for desiccated forms. But for hypo and nearly all other chemicals that you will have occasion to use in photography, the strengths are the same, respectively, whether desiccated or crystallized.

FORMULA NO. 1

TANK DEVELOPER FOR ROLL FILMS
For 20-Minute Development

Brownie Tank

20	grains	Sulphite of Soda, powdered
25	grains	Carbonate of Soda, powdered
10	grains	Pyro

2½ and 3½-Inch Tank

44	grains	Sulphite of Soda, powdered
55	grains	Carbonate of Soda, powdered
22	grains	Pyro

5 and 7-Inch Tank

60	grains	Sulphite of Soda, powdered
75	grains	Carbonate of Soda, powdered
30	grains	Pyro

Dissolve the chemicals in the order given; first the sulphite in four or five ounces of water, then add the carbonate and finally the pyro, and fill the tank to the embossed ring, with cold water. The temperature of the developer should be 65 degrees Fahrenheit.

FORMULA NO. 2

TANK DEVELOPER FOR FILM PACKS
For 20-Minute Development

For No. 1 Film Pack Tank, take:

60	grains	Sulphite of Soda, powdered
75	grains	Carbonate of Soda, powdered
22	grains	Pyro

For No. 2 Film Pack Tank:
120 grains Sulphite of Soda, powdered
150 grains Carbonate of Soda, powdered
45 grains Pyro

For No. 3 Film Pack Tank:
140 grains Sulphite of Soda, powdered
175 grains Carbonate of Soda, powdered
52 grains Pyro

Dissolve the chemicals in the order given; first the sulphite in four or five ounces of water, then add the carbonate and finally the pyro, and fill the tank to the embossed ring with cold water. Develop for 20 minutes at 65 degrees Fahrenheit.

TRAY DEVELOPERS

Pyro Stock Solution Developer

Part A

Pyro	1 oz.
Potassium Meta-bisulphite	80 grs.
Potassium Bromide	20 grs.
Water	24 ozs.

Part B

Sodium Sulphite	60 Hydrometer Test
Water	1 Pint or more

Part C

Sodium Carbonate	40 Hydrometer Test
Water	1 Pint or more

To mix for Plates:

1 ounce of Part A
1 ounce of Part B
1 ounce of Part C
7 ounces of Water

For films, use 1½ ounces of Part A and 1 ounce each of B and C with 8 ounces of water.

This developer is recommended as an ideal developer if you have enough developing to do to make it worth while. If you develop only a few times a month, I would advise the use of ready-prepared developers.

Pyro is a bad stainer of the hands, but cannot be beaten as a plate and film developer, because of the splendid quality which it gives to them if development is not carried so far that stains appear on the plate or film itself.

For removing Pyro stains from the hands, see the formula further on.

PYRO DEVELOPER FOR GENERAL USE (IF YOU HAVE NO HYDROMETER)

Part A

Pyro	1 oz.
Sulphuric Acid	20 minims (drops)
Water	28 ozs.

Part B

Sulphite of Soda (pwd., desiccated)	2 ozs.
Carbonate of Soda (pwd., desiccated)	2 ozs.
Water	28 ozs.

To mix for Developing:

½ oz. of Part A
½ oz. of Part B
4 ozs. Water

For twice as much developer, double the figures.

PYRO-ACETONE DEVELOPER

Part A

Water	16 ozs.	or 640 ccm.
Oxalic Acid	12 grs.	or 1 gram
Pyro (pyrogallic acid)	1 oz.	or 40 grams

Part B

Water	20 ozs.	or 600 ccm.
Sulphite of Soda (powdered),	2 ozs.	or 60 grams
(20 ozs. solution of 48° hydrometer)		
Acetone (liquid)	4 ozs.	or 120 ccm.

For Tray—Use A, 1 oz.; B, 2 ozs.; Water, 12 ozs. For double coated plates use 16 ozs. water.

For Tank—Use A, 1 oz.; B, 3ozs.; Iodide of Potassium Solution, 2 ozs. (see table below). Water 58 ozs. Temperature, 70 degrees. Time 30 minutes.

Iodide of Potassium Solution—Water, 30 ozs. or 1 Litre; Iodide of Potassium, 30 grains or 2 grams.

Note: The addition of the Iodide of Potass. Sol. allows the use of the tank developer from 70 to 75 degrees Fahr. without causing yellow stain or veiling, which is liable to occur otherwise. This is an excellent hot weather developer for this reason.

Contrast Developer for Plates (for over-exposed plates): Water, 30 ozs. or 1500 ccm.; Sulphite of Soda (powdered), 1 oz. or 50 grams (16° by Hydrometer test); Edinol, 100 grains or 10 grams; Potassium Bromide, 20 grains or 2 grams; Carbonate of Potassium, ½ oz. or 25 grams.

Use full strength. It can be used repeatedly. As soon as a plate shows over-exposure in the normal developer, rinse and place in the Contrast Developer and develop until sufficiently intense.

Also useful as an addition to normal developer in case same does not work with sufficient brilliancy, for which purpose the addition of a few drops is sufficient.

Metol-Hydrochinon Developer: Part A—Water, 25 ozs. or 750 ccm.; Metol, 30 grains or 2 grams; Hydrochinon, 90 grains or 6 grams; Sulphite of Soda, 1 ounce or 30 grams. Part B—Water, 25 ozs. or 750 ccm.; Carbonate of Soda, ½ oz. or 15 grams (which will test by Hydrometer, 10°).

For use, mix A and B in equal parts. Can be used repeatedly. Add one drop of a 10% solution of Potassium Bromide for each ounce of the *mixture*.

The reason for my recommending two-part developers so strongly is that the solutions keep so much longer. If combined into a single solution, the sulphite of soda, in combination with the other agents, is easily oxidized, and thus the developer loses its strength, as a result of losing its "preservative."

Hot-Weather Developer: (A good developer where no ice is available). Water, 50 ozs. or 1200 ccm.; Sulphite of Soda, 1 oz. or 24 grams; Potassium Bromide, 20 grs. or 1 gram; Citric Acid, 20 grs. or 1 gram.

For use: To 4 ozs. add 10 grs. dry Amidol.

For use using the Metric System as per above formula: Take 200 ccm. and add 1 gram of dry Amidol.

Before developing place the plate in Water, 60 parts; Formalin, 1 part, for about three minutes, then rinse well and place in the developer. Fix in an Acid Fixing and Hardening Bath.

Non-Halation Developer: Water, 40 ozs.; Metol, 6 grains; Sulphite of Soda, 120 grains; Hydrochinon, 30 grains.

Mix 30 grains of Carbonate of Soda in 10 ozs. of water, separately. Place the plate in the developer as given, without the carbonate, then add 5 drops of the carbonate solution, and rock the tray 5 minutes. If no image appears in that time, add 10 drops of the carbonate solution, and rock the tray for another 5 minutes. Keep repeating this process, and you will eventually complete the development, without having allowed the image to appear on the back of the negative. It is when the image does so appear strongly in spots that you get halation. The lack of carbonate in the developer is what serves as a check to the highlights.

Of course this developer is to be used only in cases where extreme conditions of light and shadow occur, such as in interiors taken directly against the windows. The process may require all of an hour or more, but it will be found worth while at times.

Another Non-Halation Developer: Part A—Water, 16 ozs.; Pyro, 1 oz.; Sodium Meta-Bisulphite, 90 grains. Part B—Water, 20 ozs.; Sodium Sulphite, 2 ozs.; Acetone, 4 ozs.

For Normal Cases of Subjects where halation threatens, use Water, 10 ozs.; Part A, 1 oz.; Part B, 2 ozs.

For extreme cases of halation, use Water, 10 ozs.; Part A, 2 to 4 drams (1/8 of an oz.); Part B, 2 ozs.

This is also a fine developer for light draperies and flowers.

Lantern Slide Developer: Water, 20 ozs. or 1600 ccm.; Hydrochinon, 60 grs. or 10 grams; Sulphite of Soda, 120 grs. or 20 grams; Potassium Bromide, 6 grs. or 1 gram; Citric Acid, 6 grs. or 1 gram; Carbonate of Soda, 1 oz. or 80 grams.

DEVELOPERS FOR PAPERS

Elon-Hydrochinon Developer (for Eastman D. O. P. Papers): Water, 10 ozs.; Elon, 7 grs.; Hydrochinon, 30 grs.; Sulphite of Soda, 110 grs. (dry); Carbonate of Soda, 150 grs. (dry); Potassium Bromide, 40 drops (10% solution). Dissolve the chemicals in the order given.

Nepera Solution: This developer is sold in concentrated liquid form, and by proper mixing with water can be used for both D. O. P Papers and Bromide Papers.

For Contrast, Regular or Special Velox: Nepera Solution, 2 ozs.; Water, 4 ozs. Develop for about 30 seconds. Temperature, 70 degrees Fahr.

For Softer-Effects: Nepera Solution, 1 oz.; Water, 4 ozs. Develop for about 45 seconds. Temperature, 70 degrees Fahr.

For Bromide Papers: Nepera Solution, 1 oz.; Water, 6 ozs. Temperature, 70 degrees Fahr.

Metol-Hydrochinon Developer (for Cyko D. O. P. papers): Water, 40 ozs.; Metol, 15 grs.; Sodium Sulphite, dry, 1 oz.; Hydrochinon, 60 grs.; Sodium Carbonate, dry, ¾ oz.; Potassium Bromide, 5 grs. or 50 drops of a 10% solution.

Developer for Soft Effects: Water, 16 ozs.; Metol, 23 grs.; Hydrochinon, 100 grs.; Sulphite of Soda, ¾ oz. (327 grs.); Carbonate of Soda, ½ oz. (219 grs.); Potassium Bromide, 30 grs. Use with "soft" papers.

Developer for Platinum Effects on Prints or on Enlargements: Water, 40 ozs.; Metol, 30 grs.; Sodium Sulphite, 2 ozs. (dry); Hydrochinon, 180 grs.; Sodium Carbonate, 163 grs. (dry); Potassium Bromide, 5 grs. or 50 drops of a 10% solution.

Increase the exposure several seconds and remove from the developer very quickly, as soon as the image is practically out.

A Good Concentrated Developer for Olive Tones on D. O. P. Papers: Water, 40 ozs.; Metol, 60 grs.; Sodium Sulphite, 1½ ozs. (dry); Hydrochinon, 60 grs.; Sodium Carbonate, 120 grs. (dry); Borax, 360 grs. Place in a tightly corked bottle, and when using, dilute with an equal volume of water. Add 2 drops of Nitric Acid for every 16 ozs. of the diluted solution, and 1 drop of a saturated solution of Potassium Bromide for every ounce of the diluted solution.

This developer will require at least 1½ minutes for the print to develop.

A Good Concentrated Developer for Black and White Effects on Artura Buff Papers: Water, 80 ozs.; Metol, 40 grs.; Sulphite of Soda (dry), 2 ozs.; Hydrochinon, 40 grs.; Carbonate of Soda (dry), 400 grs.

Keep tightly corked, and dilute with an equal volume of water when using. Add 1 drop of Potassium Bromide (saturated solution) for each ounce of the diluted solution.

A Good Concentrated Developer for Papers which are to be Sepiarized: Water, 80 ozs.; Metol, 56 grs.; Sodium Sulphite (dry), 2 ozs.; Hydrochinon, 240 grs.; Sodium Carbonate (dry), 200 grs.

When using, dilute with as much water, and add 1 drop of a saturated solution of Potassium Bromide for each ounce of diluted developer.

This is a good developer for securing detail in prints from soft negatives.

A Good Developer for Securing Soft Prints from Hard Negatives: Good for prints which are to be sepiarized. This is a concentrated solution. Water, 64 ozs.; Metol, 120 grs.; Sodium Sulphite (dry), 2 ozs.; Hydrochinon, 120 grs.; Carbonate of Soda (dry), 2 ozs.

When using, mix as in the preceding formula.

D. O. P. Stock Solution (concentrated) for Artura and Other Papers: No. 1—Hot Water, 20 ozs.; Elon, 60 grs.; Sulphite of Soda (dry), 2 ozs.; Hydrochinon, ½ oz.; Carbonate of Soda (dry), 1½ oz.; Pot. Bromide, 30 grs.; Wood Alcohol, 3 ozs.

No. 2 (used only for preparing soft dev. for Artura Iris)—Hot Water, 10 ozs.; Elon, 90 grs.; Sulphite of Soda, 1 oz.; Pot. Bromide, 50 grs.; Wood Alcohol, 2 ozs.

No. 3—Water, 16 ozs.; Carbonate of Soda (dry), 1½ ozs.

How to Use

Normal Developer for Artura Iris: Solution No. 1, 2 ozs.; Water, 14 ozs.; Saturated Solution Pot. Bromide, 4 drops.

Soft Developer for Artura Iris: Solution No. 1, 1 oz.; Solution No. 2, 1 oz.; Water, 13 ozs.

Developer for Artura Carbon Black: Solution No. 1, 4 ozs.; Water, 12 ozs.; No. 3, 1 oz.; Sat. Sol. Pot. Bromide, 4 drops.

A Good All-Around Developer for Artura Papers: Water, 20 ozs.; Elon, 14 grs.; Sodium Sulphite (dry), 190 grs.; Hydrochinon, 60 grs.; Sodium Carbonate (dry) 140 grs.; Pot. Bromide (10% sol.), 20 drops.

Detail Developer For Softness

	Stock Sol.	Dilute Sol.
Water	80 ozs.	32 ozs.
Elon	60 grs.	12 grs.
Sodium Sulphite	2 ozs.	176 grs.
Hydrochinon	½ ozs.	44 grs.
Sodium Carbonate	1½ ozs.	132 grs.
Pot. Bromide	60 grs.	12 grs.

For use, take 1 part of the stock sol. to one part of water. This is an excellent developer for soft working papers, such as Artura Iris. It is slow, and gives a warm olive tone. The print should be developed in this solution in from 1½ to 2 minutes, at 70 degrees Fahr. It is not a suitable developer for prints that are to be toned, but it can be used for this if slightly more concentrated, and if the prints are allowed to remain in it until it is certain that they have been fully developed.

Brilliant Developer For Contrast

	Stock Solution	Dilute Solution
Water	80 ozs.	24 ozs.
Elon	¼ ozs.	12 grs.
Sodium Sulphite	3 ozs.	132 grs.
Hydrochinon	1 oz.	44 grs.
Sodium Carbonate	5½ ozs.	244 grs.
Pot. Bromide	60 grs.	12 grs

For use, take 1 part of stock solution to 2 parts of water.

Development takes place quickly, owing to the increased carbonate, and is complete in 25 seconds at 70 degrees Fahr. The prints are blue black in color, at first, but as the developer is used, this changes to a pure black.

If it is desired to use this for bromide papers, add 1 oz. of potassium bromide to the stock, instead of 60 grs. as per the formula. The developer must be kept in absolutely air tight bottles, otherwise it will deteriorate rapidly.

DEVELOPERS FOR BROMIDE PAPERS

In general, the developers that are recommended for D. O. P. papers can be used for Bromide papers, but it is best, in the long run, to use those developers which are recommended for the special kinds of Bromide papers which you happen to use.

A Good General Developer for Bromide Papers: Part No. 1—Water, 10 ozs; Hydrochinon, 52 grs.; Potassium Metabisulphite, 18 grs.; Sulphite of Soda (dry), 300 grs.; Carbonate of Soda (dry), 1¼ ozs.

Part No. 2—Water, 10 ozs.; Metol, 30 grs.; Sulphite of Soda (dry), 300 grs.; Carbonate of Soda (dry), 300 grs.

For use, take equal parts of 1 and 2 for normal negatives.

For GRAY prints take 1 part of 1 and 2 parts of 2; this will give you the maximum of half-tones and gradations.

For VIGOROUS prints from soft delicate negatives take 2 parts of 1 and 1 part of 2.

Add 1 drop of a 10 per cent solution of Pot. Bromide to each ounce of the developer after the parts are mixed.

Amidol Developer For Bromides

Water	4 ozs.
Sodium Sulphite	45 grs.
Amidol	10 to 15 grs.

One drop of 10 per cent sol. Pot. Bromide to each ounce of developer. This developer will give rich black tones.

Another Amidol Developer For Bromides

Water	20 ozs.
Sodium Sulphite	320 grs.
Sodium Bisulphite	120 "
Amidol	60 "
Pot. Bromide	5 "

By diluting this developer it can be used for the chloride papers.

Platinum Effects on Bromide Papers

See formula for D. O. P. papers.

OTHER THAN BLACK AND WHITE TONES

Red Tones

Water	2 ozs.
Ammonium Carbonate	100 grs.
Sulphate of Copper (Blue Vitriol)	10 "
Ferricyanide of Potassium	20 "

Wet the prints and place them in this solution for about three minutes, or until the deepest shadows are converted, then wash for ten minutes.

Green Tones

Water	1 oz.
Ammonium Carbonate	100 grs.
Ferricyanide of Potassium	10 "

Bleach the print in this solution, then wash well and place in the following solution:

Water	1 oz.
Ferric Chloride	2 grs.
Vanadium Chloride	2 "
Ammonium Chloride	4 "
Hydrochloric Acid	5 drops

When the print is sufficiently toned, and evenly, wash it and dry.

Blue Tones

Water	1 oz.
Potassium Ferricyanide	10 grs.
Ammonium Carbonate	100 "

Bleach the print in this solution, then tone in:

Water	1 oz.
Ferric Chloride	5 grs.
Hydrochloric Acid	5 drops

Firelight Effects

Part A

Water	5 liquid drams
Copper Sulphate	15 drops of a 10 per cent sol (1 part to 10 of water)

Ammonium Carbonate: Add a 10 per cent solution till the precipitate first formed is re-dissolved.

Part B

Water	4½ ozs.
Ferricyanide of Potassium	6/10 dram

Mix parts A and B separately, then combine. Wash well after print is red.

Moonlight Effects

Water	5 ozs.
Ferric Ammonium Citrate	12 grs.
Potassium Ferricyanide	12 "
Nitric Acid	2/5 dram

Prints will turn blue in it. Wash till whites become clear.

Sepia Tones

The Hypo-Alum Method—This bath can be used over and over.

Boiling water	128 ozs.
Hypo	16 ozs.
Alum	4 ozs.

After the bath has cooled, mix separately and add:

Water	1 oz.
Nitrate of Silver Crystals	60 grs.
Salt	60 "

It will take from eight to twelve hours to convert prints to full sepia in a cold bath. Using the bath at a temperature of 120 degrees Fahrenheit, they will tone in about 30 minutes.

Prints need no particular attention, as the toning proceeds to sepia and stops, making it impossible to over-tone. If the cold bath is used prints may be left in it over night. Care should be used to see that the prints are immersed thoroughly and evenly. They should also be stirred occasionally during the first stages of toning to insure an even action of the toning bath.

When the hot bath is being used, it is well to keep the prints in motion, face up, by continually removing the bottom print and placing it on the top. This action will insure against burning a print, and thus spoiling it. When a print is burned it will possess dark purplish spots.

In preparing prints for toning, they should be printed a shade darker than usual, and they should be fully and evenly developed. After they are fixed, rinse fairly well in fresh water and place, *face up*, in the toning bath.

After they are toned, wash them as usual in water.

Weak, yellowish tones are caused by not fully developing the prints. Prints that are over-exposed and not fully developed will be flat and weak when toned. Using a toning bath that is not ripened with Silver Solution will cause prints to be weak in general appearance and tone.

Untoned spots are caused by failure to separate the prints during the first stages of toning; a condition which allows them to become unevenly saturated with the bath. Prints should be kept completely beneath the surface.

Round black spots are caused by air-bells forming on the surface of the print, usually as a result of placing the prints in the bath face down.

The amount of Potassium Bromide which you have in your developer when printing and developing determines the color of sepia that you will get on toning the prints. You must get the right sort of black and white print to start with! If it is too cold in tone, i. e., too blue black as a result of too little bromide, the resulting sepia will be purple. If the developed print is too warm, i. e., too brownish as a result of too much bromide in the developer, the resulting sepia will be yellowish.

Purplish tones, then, are caused by too little bromide in the developer, and by short exposure with forced development.

Yellowish tones are caused by too much bromide in the developer, as well as by over-exposure and hasty development.

Another Sepia Method

Part A

Water	20 ozs.
Copper Sulphate (blue vitriol)	80 ozs.
Potassium Citrate	75 grs.

Part B

Water	20 grs.
Ferricyanide of Potassium	75 grs.

To use: Add B to A, equal parts of each, stirring rapidly the meanwhile.

Wet the prints, then pour the solution on a few prints at a time, watch them carefully, and remove to water just as soon as the desired tone is reached. With this toner you can secure almost any shade of brown that you desire.

A Re-developing Method For Producing Sepia Tones

Part A

Water	20 ozs.
Potassium Permanganate	240 grs.

For use take ½ dram of part A; add ½ dram of Hydrochloric Acid and 10 ozs. of water.

Place the prints in the solution and rock the dish until the color entirely disappears. If the action is not fast enough, mix another half dram of A with two ounces of water and add it until the color does disappear.

Wash five minutes in running water, or in six changes of still water, allowing the prints to remain for five minutes in each change, then develop in any light you wish, without adding any bromide. Use any developer you prefer. Then wash again, but do not fix, as there is no need of it.

A Method of Producing Real Light Tones on Prints

Dissolve 2 or 3 ounces of sugar in hot water, making the solution the constituency of syrup. When it is cool add it to the developer, at the rate of 1 ounce of the syrup to 2 ounces of the developer, and proceed to develop the prints.

FIXING SOLUTIONS

Acid-Hypo Fixing Bath For Plates, Films or Papers

Water	64 ozs.
Hypo	16 ozs.

When thoroughly dissolved, add the following solution, termed the "hardener."

Water	5 ozs.
Sulphite of Soda	1 oz.
Acetic Acid (28%)	3 ozs., or Citric Acid may be used.
Powdered Alum	1 oz.

This bath can be used as long as it retains its strength, or is not sufficiently discolored by developer carried into it to stain the negatives, or the prints. The same bath which has been used for plate or films should not be used for papers.

When making this bath, be sure to dissolve the chemicals in the exact order as given. Incorrect compounding of it will cause stains. The hypo must be thoroughly dissolved before adding the acid hardener, or the solution will become milky, and stain. Too strong acetic acid will also turn the bath to a milky color. When the bath becomes frothy, throw it away. Ask for Acetic Acid No. 8 when buying, and you will get the 28 per cent kind, which is what is given in the formula.

When the bath has a sweet flavor it is too alkaline to use longer. A plain hypo bath may be used, provided you rinse the prints in a Formalin solution before washing. A plain hypo bath consists of Water, 64 ozs.; and Hypo, 16 ozs.

Short Stop Bath

Water	32 ozs.
Acetic Acid (28% pure)	1½ ozs.

Call for No. 8 at store.

This bath is used for the rinsing of prints when they are taken from the developer. As long as this bath remains acid it will instantly check development. After a certain amount of developer has been carried into it, it becomes neutralized and will no longer work properly. It is easily made and should be kept fresh at all times.

Stock Solution Hardener (one gallon)

Water	128 ozs.
Sulphite of Soda	16 "
Acetic Acid (28%)	48 "
Powdered Alum	16 ozs.

This hardener will keep indefinitely and is not decomposed by action of the air. It should be kept in a corked receptacle to prevent evaporation. With a stock solution of hardener on hand, a new fixing bath can be easily made at any time by simply dissolving the hypo in the water and adding the hardener.

Eight ounces of this stock solution is the proper amount to use in preparing the fixing bath given in the regular formula, i. e., 64 ozs. of water and 16 ozs. of hypo.

How to Test Prints or Plates as to Thorough Fixing

Water	40 ozs.
Potassium Permanganate	2 grs.
Potassium Carbonate	20 "

Soak the plate or print to be tested in water for one hour, then remove and add to the water a few drops of the above solution, which will turn a greenish yellow or brown if the water is not free from hypo.

How to Make a 10 Per Cent. Solution of Potassium Bromide

Dissolve 1 oz. of Bromide in 10 ozs. of water.

How to Make a Saturated Solution of Potassium Bromide

Dissolve Bromide in water (any amount) until no more will dissolve. Let the undissolved bromide remain in the solution.

A Clearing Bath For Pyro Stains on Negatives

Water	16 ozs.
Iron Sulphate	3 “
Sulphuric Acid	¼ oz., 109 grs.
Alum	1 oz.

Intensifier

After fixing and washing thoroughly, soak in

Water	12 ozs.
Mercuric Chloride	120 grs.
Potassium Bromide	120 “

When the image is cream color throughout, rinse and place in Sodium Sulphite, 1 to 8 of water. The darkening action takes place slowly. Wash to free from hypo.

Reducer (Farmer's)

Part A

Water	1 oz.
Ferricyanide of Potassium	15 grs.

Part B

Water	32 ozs.
Hypo	1 oz.

Add A to B. Watch closely. Action is best seen when the solution is poured over the negative in a white tray. After reducing, wash thoroughly.

This is known as Farmer's Reducer, and is generally used for reducing over-exposed plates, as its action affects the whole plate.

Before reducing, the plate should be soaked for ten minutes in water if it has been dried. First, it should be rubbed gently with a swab of cotton, saturated with a weak solution of Ammonia, to remove any grease that may happen to be on it. After removing from the water, rid it of surplus water with a swab of cotton.

If you are to reduce the negative in local portions, only, use a tuft of cotton, and rinse occasionally to prevent lines from forming. And don't use the reducer at full strength, but add more hypo, otherwise you will perform a very blotchy job. Experiment first on an old negative, for it is quite a difficult stunt to perform successfully the first few times of making the attempt.

It is well to soak the negative for five minutes in a solution of Sodium Sulphite (a teaspoonful to a glass of water), before washing, to check further chemical action.

Ammonium Persulphate Reducer (For Contrasty Negatives—under-exposed and over-developed)

Water	16 ozs.
Potassium Permanganate	45 grs.

Chapter XV

MISCELLANEOUS POINTERS

1. To Remove Silver Stains From Negatives

Make a solution as follows:

A

Water	16 ozs.
Hypo	1 oz.

B

Water	16 ozs.
Ferricyanide of Potassium	1 oz.

Mix for immediate use:

A	16 ozs.
B	1 oz.

After the negative is fixed, rinse and place in this solution and leave it therein until the stain disappears, then wash.

2. Negative Varnish

Best Grain Alcohol	20 ozs.
Crushed dark shellac	1 oz.

Shake occasionally for several days until dissolved (without heat). Allow it to settle, then decant carefully from the settlings, and add 2 drams of oil of lavender. The negative should be slightly warmed before varnishing.

3. Retouching Dope

Powdered Resin	60 grs.
Oil of Turpentine	2 ozs.

Moisten a clean cotton rag and rub the dope over the parts of the negative that are to be retouched. Be sure to blend the doped parts with the rest of the negative, to prevent lines from showing.

4. Ground Glass Varnish

Gum Sandrac	2¼ ozs.
Gum Mastic	¼ "
Ether	24 "
Benzole	6 to 18 "

The quality of the Benzole determines the nature of the matte obtained.

5. Formalin Hardening Solution

Water	30 ozs.
Formalin	1 oz.

Immersing the negative in this for a few minutes will render the gelatin perfectly insoluble, so that it can be dried by artificial heat.

The negative is not to be placed in the solution until thoroughly fixed. It should be washed after having been in the Formalin solution.

6. Denatured Alcohol as a Hardener

It can be used in place of the formalin hardener, provided the negative is thoroughly fixed before immersion in it, and washed afterwards.

7. To Remove Pyro Stains From the Fingers

Rub with a large piece of Citric Acid directly after developing, before the fingers have dried.

Another method is to make a solution as follows:

No. 1 saturated solution of Potassium Permanganate.

No. 2 Sulphuric, C. P. (chemically pure), a few drops.

By soaking the fingers in the above solution for a few minutes, then washing and placing them in the hypo, the stain should disappear, unless too old and dry. If the stain does not come off, wet your hands in warm water till soft, then apply the solution to all the stained parts; then after another washing, bleach them out in a saturated solution of potassium metabisulphite.

If the stains still remain, try this: Put more of the permanganate solution on the nails, then immerse in a solution made up of two or three drams of Hydrochloric Acid and 8 ounces of water, to which is added 5 crystals of Hypo. This is a very strong solution, so be careful that you don't leave the hands in it so long that you lose a part of the skin itself!

8. Dead Black Varnish

Alcohol	8 ozs.
Lamp Black	½ oz.
Liquid shellac	1 oz.

9. Cleaning Greasy Bottles

Wash with benzine, or permanganate of potassium, to which has been added some hydrochloric acid. Bottles that have contained resinous substances, wash with potash or soda and rinse with alcohol. Bottles that have contained essences, wash with sulphuric acid, then with water.

10. To Remove Film From Glass

Part A

Water	4 ozs.
Sodium Fluoride	6 grs.

Part B

Water	1 oz.
Sulphuric Acid	6 drops

Place the negative in Solution A for two minutes and then place in Solution B for two minutes. Then lift the film with the finger from one corner of the plate. It will soon leave the glass.

11. Mounting Prints Without Cockling

Make a thick sauce of pure table gelatin, and coat the back of the print with this while it is fairly hot. After it is dry, dampen mount with water, and lay the print on. Cover it with a sheet of clean paper, and apply a warm flat-iron until the gelatine melts. If the right amount of water is used on the mount, there will be no curling after mounting, even if very thin mounts are used.

12. Starch Paste

Make a smooth paste by mixing 1 ounce of powdered starch with 12 ounces of water. Be sure that the starch is all converted to paste and that no lumps of anything are present; then boil half a minute and allow to cool. Stir while boiling! Remove the dried layer of gelatin from the surface before using for pictures.

13. Safe Light For Panchromatic Plates

Coat any glass with the following solution:

Water	10 ozs.
Tartrazine	75 grs.
Patent Blue A	75 "
Napthol Greens	75 "
Sulphuric Acid	30 drops

Stain the plates as deeply as possible, and use two plates for safety.

14. To Flatten Double-weight Prints

Part A	
Boiling Water	9 ozs.
Gelatin	½ oz.
Part B	
Boiling Water	3 ozs.
Alum	½ dram.
Part C	
Oil of Cloves	2 drams.

Mix and strain through cheesecloth while hot. To use, take a little from the stock and place in a cup. Place the cup in hot water until the "backing" is melted, then apply to the back of the prints with soft cloth or a tuft of absorbent cotton.

15. To Remove the Film From Negatives to Obtain Clear Glass

Place a number of negatives in a metal vessel; cover them with water; throw in a small handful of sodium carbonate, and heat until the film softens enough to permit of being rubbed off with a tuft of cotton or cloth.

16. Backing For Plates to Prevent Excessive Halation

Ordinary opaque can be used, or the following formula:

Part A	
Burnt Sienna	½ oz.
Caramel	1 "
Gum Arabic	½ "
Part B	
Water	½ oz.
Alcohol	½ "

Dissolve A in B several days before using, and place on the negative with a brush.

17. To Keep Powdered Chemicals Dry

Place in the container a small lump of Calcium Chloride wrapped in a small piece of cotton cloth. It will absorb the moisture and thus prevent the protected chemical from being decomposed itself by the moisture.

18. To Make Stoppered Bottles Air-tight

Wax the stoppers.

19. To Polish Squeegee Plates

Dissolve 10 grains of beeswax in one ounce of benzine; allow this to stand for a few hours, in which time a precipitate will be formed. The clear solution should be used for polishing the tins, applying with a soft cloth such as Canton flannel. When the surface of the tins has been thoroughly covered with this preparation, it should be polished with the flannel to remove as much of the wax as possible. It may be necessary to add a little more benzine if the wax used is too thick.

Clean the tins occasionally with scalding water.

20. To Make Ink For Writing on Film

Water	1 oz.
Potassium Iodide	100 grs.
Iodine	10 "
Gum Arabic	15 "

To use, write on the film side of the negative, then immerse in the hypo bath, then wash and dry. The letters will print black.

21. To Make Enlargements More Brilliant

Use waxing preparation such as can be secured at many photographic supply houses, or use a little paint varnish with turpentine.

22. To Trim Large Sheets of Cardboard

You need a sharp knife; a good ruler; and a piece of linoleum, larger than the largest piece of cardboard to be cut. Lay the board on the linoleum, and run the knife along the edge of the ruler according to how you plan to cut the board.

23. To Make Deckle-Edged Board

Fold, then wet the folded edge, and tear apart.

24. To Clean Porcelain

Make a solution of two ounces of Potassium Permanganate and one-half as much Sulphuric Acid. Rub the porcelain, or glass with a wad of cotton saturated with the solution. A little water and a few drops of Hydrochloric Acid will clean developing trays.

25. To Clear Prints (glossy) of Abrasion Marks
Rub with wood alcohol and cotton

26. To Reduce the F to the U. S. System
Square the stop and divide by 16.

27. Pot Pourri

a. Don't store paper in a hot place.

b. In warm weather, don't use old developer or old fixing bath.

c. When examining a wet negative over the kitchen or parlor floor, hold a wad of cotton on the lower corner so that you won't soil the carpet or floor.

d. When straightening cockled, dry prints with a ruler, steam them first to prevent their cracking during the process.

e. You can buy rubbers for the ends of the tripod legs for indoor use.

f. Film cloud negatives are ideal because you can use either side, thus possessing practically two negatives.

g. In an emergency, a developing tray can be made out of oil-cloth by constructing a wooden frame and covering it with the oil-cloth, you can make it deep enough to contain several ounces of liquid, or you can lay the paper to be developed on the oil-cloth and develop it by rubbing the developer evenly over it with a swab of cotton saturated with developer.

h. Wooden clothes-pins can be used when developing films, to keep the fingers out of the developer.

saturated with the solution. The Permanganate solution should be very strong. A little water and a few

i. To keep developer warm in the winter, use warm sand under the tray; or a water bottle; or an alcohol lamp placed under a sheet of iron holding the tray; the iron can be placed across bricks, and the lamp can be kept turned down very low.

j. When developing by tank, every degree in temperature, of the developer, above or below 65 degrees, makes a difference of one minute in the time of development, respectively.

k. The faster the plate, the longer it needs to develop, because it intensifies slowly. The high-lights need not show through much, however.

l. When enlarging, in order to hold back small local areas from printing too dark, cut a strip of glass eight inches or so long, by one-half inch wide; fasten a small piece of cotton or glue paper to one end, and keep the portion which you wish to shade covered with it during a period of the time given to the exposure. Don't hold the shade perfectly still, for a sharp line will appear around the shaded portion if you do.

m. When enlarging, in order to print out small local areas that are considerably darker than the rest of the negative, make a hole in a large sheet of opaque paper, and so hold it during a period of the exposure that the local portion will be given a longer exposure than the rest of the negative. All kinds of so-called vignetting can be done with practice.

n. When plates start developing very suddenly in the developer, take them out quickly; place them in a tray of water, and add 8 or more drops of potassium bromide, then replace the plates and proceed. It is of no avail to add the bromide unless it is done early.

o. Prints from extremely contrasty negatives can be considerably improved by using bromide paper in contact. The printing light must, of course, be greatly subdued, otherwise the paper will over-print to an almost uncontrollable extent.

p. To print from a wet negative slightly squeegee a piece of clear celluloid to it, and place the printing paper on it. You can easily clear the film surface from a film in the same manner as from plates.

q. Strong developer makes contrasty contact prints, and soft enlargements on bromide papers.

Weak developer gives soft contact prints and contrasty bromides.

Cold developer produces weak, gray prints.

Slow printing is the best for producing detail. Diffused light assists in this, and stopping down when enlarging gives the same results. Tissue paper over the printing frame makes an ideal diffusing medium.

r. Conditions which produce contrast in negatives:

Slow plates.
Harsh lighting.
Cold or strong developer.
Slow drying.
Restrainer.
Small stop.
Under-exposure.
Over-development.
Minimum amount of sulphite.
Excess of carbonate.

s. Conditions which produce soft effects in negatives:

Fast plates.
Flat lighting.
Diffused light.
Warm or weak developer.
Under-Development.
Large stop.
Dirty lens.
Over-exposure.
Maximum amount of sulphite.
Minimum of carbonate.

Tripling the Metol, using no Hydrochinon, and using the same amount of the other ingredients called for in the formula, will produce the maximum of softness.

t. Be sure to use a soft, old, linen rag when cleaning a lens. Don't allow moisture to dry on the lens.

u. An excellent arrangement for the bromide bottle is to make a hole through the stopper and insert an ink dropper therein.

v. The value of a note book:

A most useful adjunct to any camerist's equipment is a note book so arranged as to permit of quickly entering notes under appropriate headings. Then, when reading over magazines and other periodicals, you can copy therefrom those bits of information that will prove very useful, off and on.

My own note book is arranged under such headings as Developing, Printing, Fixing, Dodging, Soft Effects, Useful Formulas, etc., etc., and contains a very handy index to material in magazines which I have read, to which I find occasion to refer frequently.

In the back of this loose-leaf note book I fasten one each of every set of instruction sheets which come with plates and papers, so that it is easy to look up any desired formula very quickly. Excellent little booklets on all of the various common phases of photography are issued for the asking by the manufacturers of plates and papers.

Having spent considerable time and study on pictorial work for competitions and exhibitions, I have found it helpful to make my note book still more unique by devoting one section of it to a scrap book of pictures which have won prizes in various parts of the country, with any criticism of the pictures that happen to be published with them. This practice has proven to be a tremendous help towards learning something of pictorial work.

w. Competitions for Amateurs:

If there is any one feature of our every-day life which adds spice to the fun of living and makes it more worth-while, it is a "hobby." And of all hobbies which supply us with a variety of pleasures, it is the hobby which leads one to delve deep into the magnetic field of amateur photography.

When you reach the stage where you are confident that you can make prints possessing pleasing tones, and when, at the same time you possess a smattering knowledge of the principles of composition, then there is a field open to you which will be not only very attractive, but which also will be educational, and that is the field of competition.

Magazines, photo-companies, and newspapers are constantly conducting competitions in which amateurs are invited to participate by entering samples of their workmanship.

The prizes which you will aspire to win, and probably will win occasionally represent but one feature of the sport—the greatest returns come in the form of pure fun as a result of constantly anticipating something, and in the appreciable increase in the field of your photographic knowledge and ability.

The common reason why beginners are loath to enter their pictures in such competition is that they are not aware of what they are missing. In my own case, I had been puttering away at the game for eight years before finally deciding to make the plunge. A first prize "right off the bat" almost resulted in heart failure, but I recovered, and with such an appetite for more that there has been no let-up since.

The fun of it all has been just as great, only on a different scale, as that which comes from trying to beat out the other fellow at tennis, or golf, or swimming, or what not. Try it and see!

Competitions for beginners are conducted by several magazines, such as Photo-Era, Wolfeboro, N. H.; American Photography, Boston Mass.; American Boy, Philadelphia, Pa.; Boy's Life, 200 Fifth Avenue, N. Y.; The Camera, Philadelphia, Pa.; occasionally by the N. Y. Evening Post, Kodakery, and other periodicals. All you need do is to secure copies of these periodicals; read the rules and try it.

If your courage is good, and you are persistent, you will surprise yourself, eventually, by attaining an experience that will place you far ahead of the ordinary amateur.

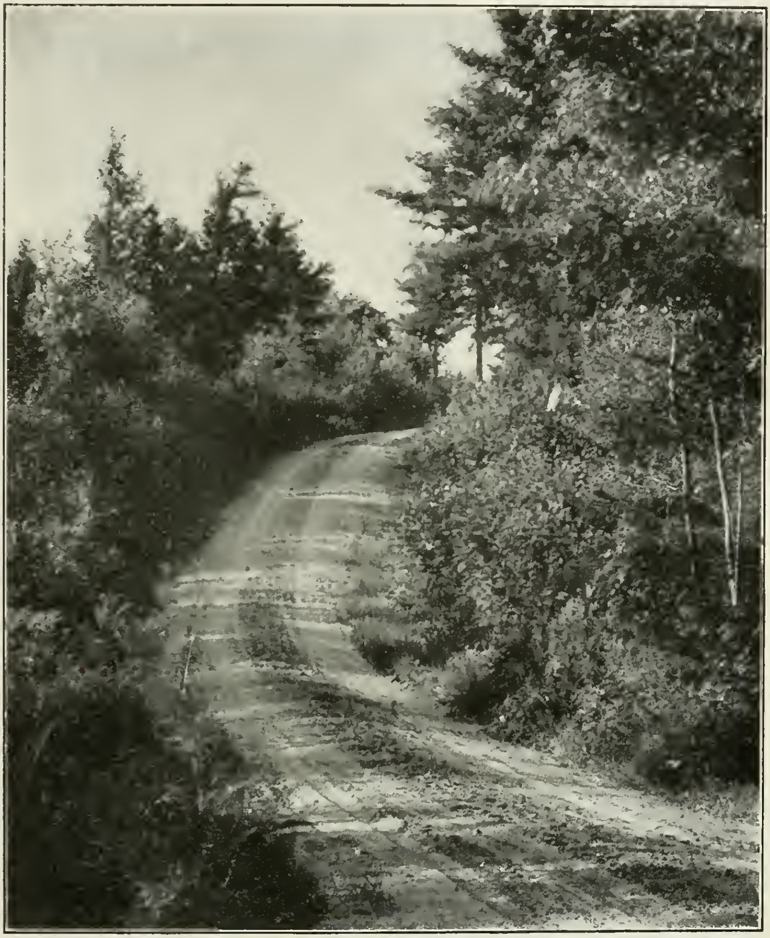

Fig. 162

Up From the Lowlands—Road pictures are popular because of their graceful curves

x. Camera Clubs.

If you are fortunate to be living in a town where a live camera club exists, by all means, join it. For real good fellowship you can find no better source, and, as all are hobbyists and ready to help the other fellow, you will find a constant fountain of knowledge at your service.

y. When copying rough surface pictures, rub it over with "oil of spike" to add brilliancy, particularly to the shadows.

z. When printing from a very contrasty negative, stick onion skin paper (tissue) to the front of the printing frame, drawing it tight. Then place your negative in the frame, and with charcoal, or soft pencil, rub locally over the tissue that covers the thin portions of the negative.

If small portions of the negative are decidedly dense, oil the tissue in those spots.

CHAPTER XVI

HOW TO MAKE THE CAMERA PAY

THE question frequently arises in the amateur's mind, "How can I make a little money on the side?" The solution is not at all difficult, provided you are a careful worker. Having been through just such a period, myself, I am sure that I can give reliable information on the subject.

What I am to write here is written without any particular sized camera in mind, for if your's is a very small one, you can use a fixed-focus enlarger, and if it is 3¼ x 4¼, or larger, you will be able to do business with it without enlarging. I will say, however, that the most popular size for producing pictures that are salable is the 4 x 5 size. I have found a combination of a 4 x 5 and a 5 x 7 a very useful one.

Bear in mind, please, that I am not treating this subject as I would were I advising you how to go into the photographic business; instead, as stated a few minutes ago, I am writing this with an eye to advising how to make a little money on the side.

Post Cards

If you live in or near a village, by making up a lot of different views of prominent buildings, streets, and landmarks, you will be able to sell them to local dealers at a fair profit. Or you can pay some energetic boy a penny for every one that he sells for you, direct to the public.

If there is a successful local baseball team, or school athletic team, you have another excellent opening. First sell all the mounted pictures that you can from each negative, then launch your post-card sale.

Other events that provide subjects for post cards are special occasions, such as field days, parades, etc.

If you are a student at school or college you have a large field for work, especially if you can make good flashlights, for, with out-door sports, class rides, and individual picture work of the athletes and others. and with indoor "feeds," theatricals, etc., you have a large variety of subjects on which to work.

Groups

It is always well when a group is photographed, to secure all the mounted picture orders possible and then wind up on post cards.

One summer I found it quite a profitable procedure to photograph mill groups, baseball teams, camp groups, and parties. This is really the most remunerative plan that the amateur in the smaller towns will find.

Combination Group Pictures

At times considerable money can be made by arranging several pictures pertaining to one subject, on a sheet of cardboard, and copying the combination. For instance, such a set of pictures of a large well managed farm; or a set of pictures illustrative of the program of a summer camp; or a public building, such as a church or a schoolhouse, containing an insert of the pastor, or the principal. These and many other similar ideas can be advantageously worked out.

News Pictures

If you live in the city and possess a speed camera, you have a very large field, provided you are on the alert and have an eye for pictures that are "newsy" and possess human interest. Specific examples are as follows: The mayor laying the corner of some public building; an accident; a fire; a parade of importance;

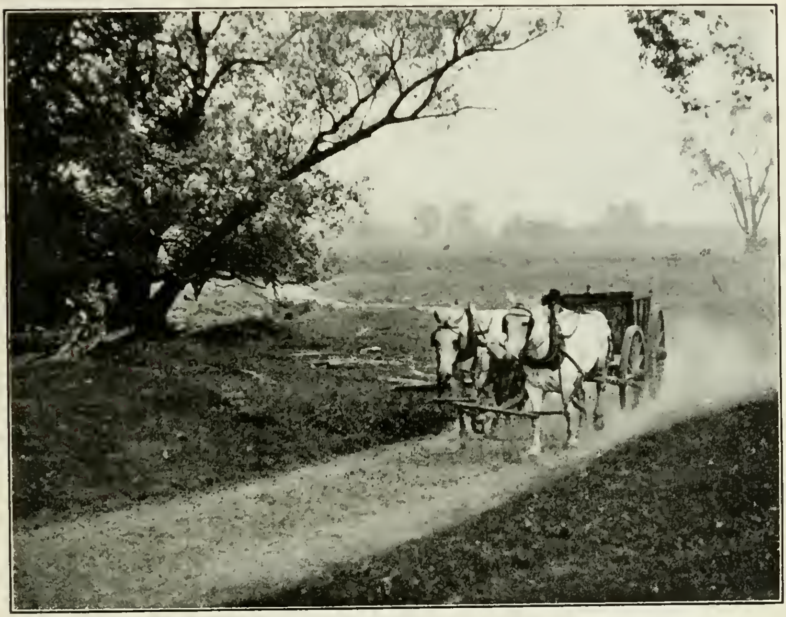

Fig. 163

From Out the Meadow—The S line; the slant line (of tree) and the principal object—all are ideal. There is also atmosphere. What is lacking is a sky of quality the picture of some high ranking political official of the city; or in fact, any well known character engaged in some public function. Such pictures are most likely to sell if submitted early, and on glossy paper, with a brief caption (description) attached.

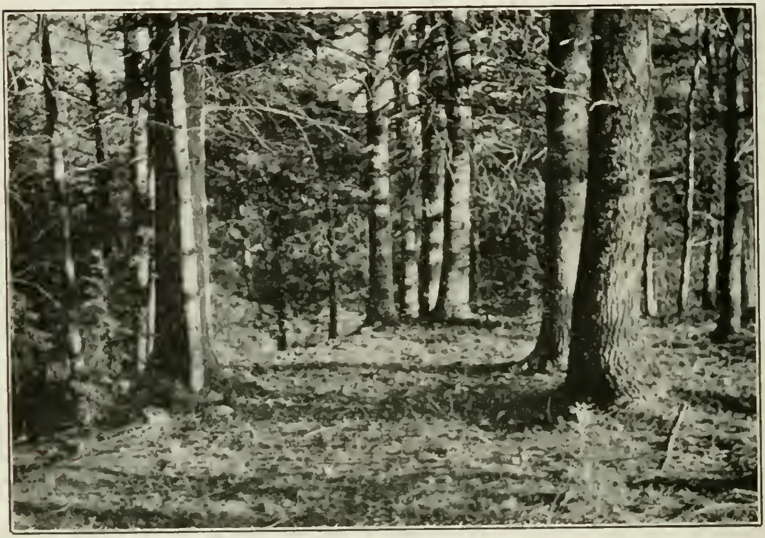

Fig. 164

Beneath the Pines of Maine—An excellent illustration of the triangular arrangement of trees in composition. By The *French Bros.*

This particular field is so broad that it would be worth your investment were you to purchase a copy of the book entitled "Cash From Your Camera," published by the American Photographic Publishing Company of Boston, Mass.

Pictures of Children

There are no better buyers of pictures than fond parents, and the particular pictures which please them most are those of the baby, meaning the youngest of the family, whether still in toddling clothes or in pants. By hanging around the seashore, and other haunts of many children, and making snaps of small groups, then learning the names of the "papas" and "mammas," you will surely be able to sell them at least a few copies of the pictures when you have them to show.

Fig. 165

When Winter Bids Farewell—A splendid rendition of spring foliage along the wet places of the lowlands. Photo by *W. R. French*

I have mentioned a few of the most practical methods of making money on the side; there are many unmentioned methods of which you can easily learn by reading the current photographic magazines.

It is scarcely necessary for me to state that if you are practicing making pictures as a business on the side, you should learn to make your own solutions; do your own developing and finishing; and buy your material in large quantities—paper and mounts in gross lots, and other material in proportionately large quantities.

Conserving Material

Naturally, the decisive factor in knowing how to avoid waste, no matter what the line, is knowledge of what you are doing. This is particularly true in the photographic line. The largest waste, expressed in terms of cash, is that of spoiled plates and films. The solution of this problem is:

1. Use a meter for exposures until you can judge of the amount of exposure to give, by looking at the ground glass.
2. Develop by the Tank System.
3. Use only enough fresh hypo or developer to efficiently accomplish the task at hand, and then throw it away so that you can't use it at some other time when in a hurry, and thus spoil your whole set of plates, or whatever else you are to develop or fix. Using old developers at any time of the year, and using old hypo in the warm months will spoil more plates, films and pictures than you could replace at many times the cost of fresh solutions.

On the other hand, don't use so little of any solution

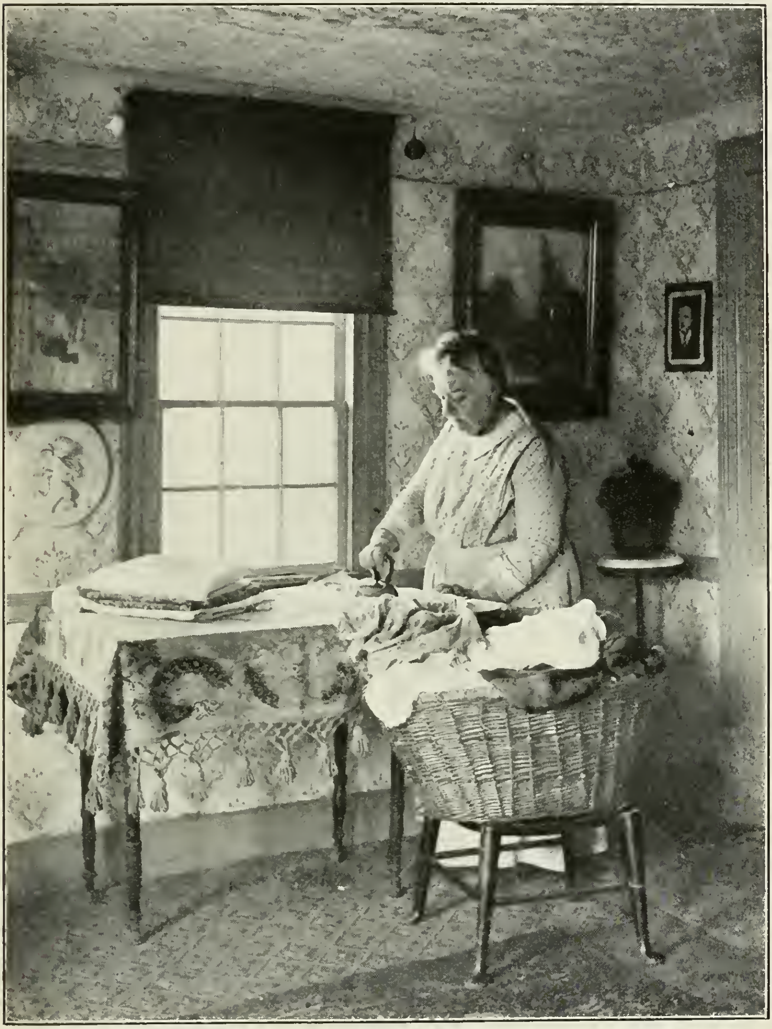

Fig. 166

A Woman's Work Is Never Done—Indoor Genre as to spoil your films or paper through failure to have them completely immersed throughout their stay in the solutions.

4. Use small test slips when printing, instead of whole sheets. You will save both time and money in the end.

5. Keep your solutions as near as possible to the temperature specified in the formulas used.

6. Keep a constant record of data regarding exposures, and consult your notes every time you are in doubt as to what exposure to give. A good carpenter not only masters his tools, but also builds according to definite plans, knowing that if he deviates a fraction of an inch from his set of plans, his finished product will be out of plumb somewhere.

A filler of prescriptions realizes that his scales and all other measuring devices must be absolutely correct, and that he himself must be accurate in his work, otherwise someone must suffer as a result of his carelessness.

Our dear old grandmothers were so conscientious in their efforts to have our pies, cakes and hearty foods "just so" that whenever something went wrong as a result of improperly regulating the oven or mixing the cooking ingredients, they were exceedingly chagrined.

CONCLUSION

No matter what we attempt to do, there are but two ways of doing it—the right and the wrong way. More of us adopt the wrong way because it seems easier and quicker, and it is natural to take chances. But in reality it is nothing but shortsightedness on our part, because we don't figure ahead, and perceive that the accurate method will eventually win out.

You, who aspire to become makers of real pictures, take these last few paragraphs seriously indeed, and if you have been slopping along, producing unsatisfactory results, start again, and start right. Adopt the policy of being accurate and you will feel more than repaid for your efforts by making pictures which will be admired by all who see them.

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